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food **DIGEST**



**Central Food Technological
Research Institute, Mysore,
CSIR, India.**



**National Information System
for Science and Technology
Department of Scientific and
Industrial Research, New Delhi**

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National Information Centre for Food Science and Technology
Central Food Technological Research Institute,
Mysore - 570 013, India

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CONTENTS

1. Raw Materials		157
2. Storage and Infestation Control		158
3. Food Additives		163
4. Processes		164
5. Byproducts and Waste Utilization		169
6. Processed Products		-
7. Equipment and Machinery		171
8. Packaging		175
9. Analysis		-
10. Commercial Intelligence		175
11. Food Regulation, Quality Control & Hygiene		191
12. Transfer of Technology & New Industries		211
13. Personalia		-
14. Special Article -		-

Index

Raw Materials**266 Survey on culinary herbs**

The Geneva-based International Trade Centre sponsored survey on herbs grown in India has been completed by the Spices Board.

The survey to collect information on various types of herbs grown in different States was started in October 1989.

The survey estimated consumption of fresh culinary herbs at about 200 tonnes per year in the country. Of this, 64 tonnes are produced in the country and the rest imported, a Spices Board release said.

Nilgiris, Delhi, Srinagar and Shillong were identified as ideal for large-scale cultivation of herbs.

The Board is considering a package to assist the Tamil Nadu Horticultural Department to help small farmers procure herb seeds.

The Board will pass on information on availability of fresh herbs in the country to star hotels presently importing to meet their requirements, the release said.
(Financial Express 20 August 1990, 8)

267 A bumper crop of biotech

The U.S. Department of Agriculture has approved nearly 100 test plantings of crops that have been genetically altered to give them traits such as pest resistance and tolerance to weed killers.

Calgene, a biotech firm in Davis, Calif., has developed a tomato that does not rot as fast as normal varieties and hopes to market the new product by 1993. Shrimp may soon be given disease-fighting genes taken from sea urchins.

(Time International 1 October 1990, 60)

Storage and Infestation Control

268 Seed extract prolongs seafood shelf life

Seed extracts from the Indian redwood tree might help prolong the shelf life of seafood by the action of chemicals that inhibit bacterial activity, scientists from the college of fisheries in Mangalore have reported.

A fraction of the crude seed extract of the tree Adenanthera pavonia inhibited bacterial activity which causes fish to rot, according to the scientists who studied the effect of the extract on fish spoilage bacteria.

Seafood spoils primarily through bacterial activity. The bacteria help produce odorous chemicals, mainly trimethylamine and other volatile sulphur-containing compounds like hydrogen sulphide.

The scientists N.M. Sachindra and Iddya Karunasagar separated the extract into three fractions through a chromatographic separation process. Reporting their findings in the Journal of Food Science and Technology, the scientists said one extract which contained organic compounds called ketones inhibited the production of hydrogen sulphide and trimethylamine by bacteria. The researchers used several species of bacteria in their tests.

The production of hydrogen sulphide by bacteria is due to the action of an enzyme on cysteine. The ketones present in the extract inhibit the enzyme, the scientists said in their report.

Prawns given a dip-treatment in this fraction had lower bacterial counts and the levels of trimethylamine and volatiles like hydrogen sulphide were lower than in the controls, they said. (P.T.I. Science Service 9(16), 1990, 1)

269 A new preservation technique for storing fresh chilled pork

Scientists in Australia have developed a technique for storing fresh chilled pork for 6 weeks, about twice the current storage time. The extra time will allow Australia to ship pork to Japan and South East Asia.

The technique was developed in Brisbane at the Cannon Hill Meat Research Laboratory of the CSIRO, Australia's research organization. It involves dipping pork cuts in a solution of 1.5% acetic acid held at 55 C for 10 seconds before vacuum packing. (Chemical Weekly 35(43), 1990, 97)

270 Alcohol sterilization curb food poisoning

A Japanese firm has developed an alcohol spraying system which effectively kills bacteria breeding on the surface on food products during packaging thereby preventing food poisoning caused by bacteria such as pathogenic colon bacillus Staphylococcus aureus and Salmonella.

Most food products are generally heat-sterilised during the production process, but later handling can sometimes expose them to bacteria.

The new alcohol based system kills that bacteria as it can be easily installed on almost any type of packaging machine. It detects products transported by conveyor using a photo sensor and sprays alcohol onto them just before packaging.

Since it uses pump pressure - not atmospheric pressure - to spray alcohol, there is no possibility that bacteria in the air will be sprayed on the products at the same time. Also, the amount of alcohol to be sprayed can be adjusted. The spray is a 75 per cent ethyl alcohol solution, which provides the best sterilizing performance.

(P.T.I. Science Service 9(7), 1990, 17)

271 India's first commercial food irradiation unit

India's first commercial food irradiation complex is to be commissioned in Cochin shortly. The unit will initially irradiate spices and later on it will be extended to items like prawns, fish, onions and potatoes meant for export.

The complex, jointly set up by the BARC and the Spices Board is nearing completion. Cobalt 60 is the irradiating radio isotope to be used in the complex. Food irradiation is a process by which food products are exposed to gamma rays from a radio-isotope to prevent microbial contamination, infestation by insects and sprouting. Irradiation also extends the shelf-life and allows the ripening process.

(Chemical Weekly 35(52), 1990, 92)

272 Food irradiation studies at BARC, Bombay

Some of the salient features of food irradiation studies done at BARC are as follows:-

Research carried out during the past two and a half decades have shown that low (0.05 - 1.0 KGy) and medium (1.0 - 10.0 KGy) doses of gamma irradiation can be used for availing specific benefits in terms of extended storage of a variety of foods. The sources available at present at Food Irradiation and Processing Laboratory for irradiation purposes are: (1) Food Package Irradiator (100,000 curies) and Gamma Chamber (4,000 curies). A moving bed onion irra-

diator with a strength of 20,000 curies is being fabricated in collaboration with the Central Workshop. In addition, a spice irradiator is being planned for fabrication.

Low dose applications

Low doses of gamma radiations are employed in the sprout inhibition in potatoes and onions, for delaying the ripening of fruits and in the disinfestation of grains and dried fishery products.

Sprout inhibition of onions and potatoes (0.05 - 0.15 KGy):

The dose response for sprout inhibition, influence of interval between harvest and irradiation, storage and transport trials on onions were studied in addition to the evaluation of flavour quality, wholesomeness and toxicological safety. Besides inhibiting sprouting, the dose selected for potatoes enabled the prevention of solanine synthesis and controlled tuber moth infestation. Since irradiated potatoes were not suitable for storage at ambient conditions because of development of microbial soft rot, storage at 10/15 C was recommended.

Delayed ripening of fruits (0.25 - 0.75 kGy):

Suitable procedures are evolved to extend the shelf life of mango by irradiation in combination with skin coating, kinetin dip, refrigeration or storage at modified atmosphere. The pathogens induced in mango such as from stem-end-rot, anthracnose and lateral rot have been isolated and effective combination treatments devised for the control of disease.

Disinfestation of wheat (0.25 - 0.75 kGy):

Optimum dose levels for the elimination of various insect pests and post irradiation storage conditions were standardized. Irradiated wheat was evaluated in terms of composition, nutritive value, germination properties and bread making abilities as well as toxicological and wholesomeness attributes employing mammalian and microbial systems. Some of these data provided basis for the international acceptance of safety of irradiated foods.

Medium dose applications

Moderate doses are used for the extension of shelf-life of fish and meat, elimination of pathogens from frozen seafoods and for the microbial decontamination of spices.

Preservation of seafood (1 - 5 kGy):

Three different approaches were made for the preservation of seafoods. 1) Extension of shelf-life of fresh fish in ice using radurization process (1 - 2 KGy), 2) Dehydro-irradiation process to eliminate refrigeration and freezing for storage, and 3) Utilization of less utilized fish as a source of protein as in the case of Bombay duck and doma. The radiation doses for each fish species was optimised based on the sensitivity of microflora present in the particular variety. Wholesomeness studies conducted with irradiated shrimp and mackerel ruled out any deleterious effect of irradiation.

Elimination of pathogens of frozen seafoods:

The contamination of frozen seafoods with enteric pathogens like *Salmonella* sp. and *Vibrio parahaemolyticus* is a vexing problem for the export trade. While treatment with chlorine water and ethylene oxide was ineffective, radicidation process (4 kGy) developed at BARC completely eliminated the pathogens from prepacked frozen shrimps. The irradiated samples were acceptable even after 4 months storage.

Irradiation of spices (1 - 10 kGy):

Microbial population in pepper, chilli, cardamom, cinnamon, nutmeg, turmeric and ginger were reduced following exposure to gamma radiation and a dose level less than 10 kGy was sufficient to sterilize the spices. Fungal population was eliminated even at 5 kGy. The infesting insects at all stages of metamorphosis could be effectively eradicated at dose below 1 kGy. The flavour and other quality attributes did not show measurable variations.

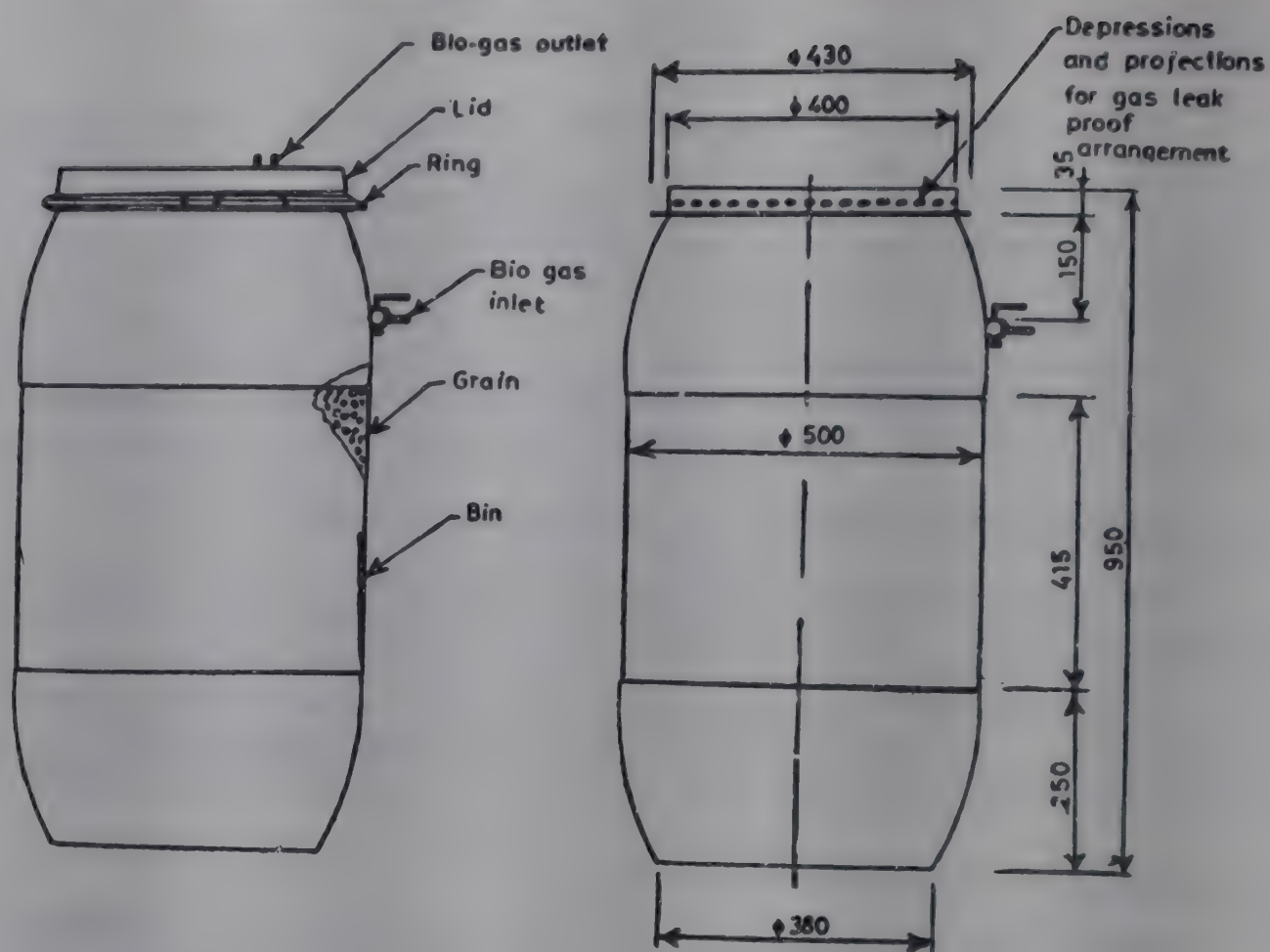
Clearance for Food Irradiation

Ministry of Health and Family Welfare, Government of India, in January 1986 accorded clearance for irradiation of onions to inhibit sprouting, frozen seafoods and spices intended for export. An apex body, National Monitoring Agency (NMA), was constituted thereafter for overseeing all aspects involved in food irradiation. (Food Irradiation News 1(1), 1990, 5-7)

273 New non-insecticidal method of insect control

Post-harvest losses of food production in India amount to 10-15 percent, of which damage by insects alone accounts for about 2.5 percent. Fumigation with insecticides for control of stored grain insects, though common, has the disadvantages of the insects developing resistance and the stored food getting contaminated with residues of the harmful insecticide. Hence an attempt was made to use biogas, which consists mainly of methane and carbondioxide, for control of storage pests of paddy and sorghum.

Biogas fumigation grain storage PVC bin



PVC bin

A special type of leak-proof PVC bin of one quintal capacity was developed for this purpose. Rectangular in shape, it has a circular mouth provided with a removal lid and ring. The lid has gasket arrangement to arrest leakage of biogas from the bin. The inlet gate valve is fitted at three-fourth height of the bin, which ensures 75 percent of space for grains and 25 percent of space for biogas.

The grain/seeds infested with the storage insect (Rice weevil, *Sitophilus oryzae*) were fumigated with biogas at the rate of 10 litres at 1.4 kg/cm^2 pressure directly from a biogas plant. The biogas was maintained in the bin for periods of 7 and 10 days.

It was noticed that for 100 percent kill of the insects, the gas should be allowed to remain in the bin for 10 days. During this period, the biogas penetrates well through the pore spaces to all the layers of the grains/seeds (i.e. top, middle and bottom) bringing nearly complete disinfestation.

The germination of the fumigated paddy and sorghum seeds was not affected due to biogas. Similarly, the cooking qualities of the fumigated grain, tested after well aeration, did not show any undesirable change.

Biogas is available in most farm-steads. Further, in the present context of mammalian toxicity and residual food problems, these findings are of great significance.
(Invention Intelligence July 1990, 326-327)

Food Additives

74 Supercritical fluid extraction for natural vanilla extract

Using supercritical CO_2 instead of aqueous ethanol produces a higher purity vanilla extract - containing upto 36% vanillin, Vs about 20% for the alcohol extraction method. Because the process, which recovers 97% of the vanillin in the beans, is carried out at near ambient temperature, delicate flavour and fragrance of the compound are preserved.

The above breakthrough in fragrance technology was reported by Prof. Paul Barton of Pennsylvania State University (State College) at A I Ch E's Spring National Meeting in Orlando, Florida last March.

Vanilla beans are first cryoground (ground with dry ice to avoid damage due to heat generated by grinding) to about 0.2 mm. Then they may be water-soaked, and are put in an extraction vessel. Supercritical CO_2 (at a pressure of about 1600 psi, temperature of 306 K and solvent concentration of 15 g. CO_2 /g (dried bean) flows downward through the bed of beans for 19 hr carrying extract out with the dense gas phase.

Yield is about 0.10 g. extract/g. dried beans, compared with 0.084 - 0.093 g/g for alcohol extraction. Extract samples have been sent for testing. An economic analysis of a preliminary commercial process design was favourable and scale-up studies are planned.
(Chemical Weekly 35(43), 1990, 97)

275 A bioengineered food ingredient chymosin approved by FDA in USA

Pfizer Inc (New York City) is the first company to get the approval of FDA to use a genetically engineered bacterium for making a food ingredient. The product the mammalian enzyme Chymosin also known as calf rennin, which is used widely by the dairy industry as a milk-clotting agent (in cheese making), and to curdle milk into curds and whey.

Traditionally, chymosin is extracted from the stomach of a newborn calves. In contrast, Pfizer has implanted the calf gene carrying the genetic code for chymosin into the K-12 strain of E-coli. This modified bacterium is then induced to express recombinant chymosin that is purer than its natural counterpart. The company has scaled up the process and is producing chymosin, under the name Chy-Max, at a new fermentation plant in Terre Haute, Indiana. Chy-Max has won approval in Australia and is undergoing review in Canada and Europe.

(Chemical Weekly 35(43), 1990, 97)

276 A natural ingredient developed to replace monosodium glutamate (MSG)

A natural ingredient designed to replace MSG in processed foods has been recently introduced by Fries and Fries (USA). The proprietary replacement can be used in processed meats, such as sausages, sauces for meat and vegetables, seasonings, condiments, gravies, soups and oriental foods.

It is offered in dry powder form which can be applied by mixing or marinating, depending on the product. It is stable in microwave ovens, freezing, hot fills and retort.

For further information contact: Fries and Fries, 1199, Edison Drive, Cincinnati, Ohio 45216

(Chemical Weekly 35(52), 1990, 92)

Processes

277 New variety of sunflower oil

A new variety of sunflower oil has recently been developed in France, reports CEDUST.

Its composition is more conducive to diet equilibrium. It was obtained through a selection process and has been given the trade name "Oleisol". Its oleic acid content is 60-80 percent compared to 20-25 percent in traditional sunflower oils. "Harmful" saturated fatty acid content is not more than 12 percent in the new oil.

As oleisol has a high oleic acid content coupled with the near absence (1.2 percent) of another acid (n-3 linolenic acid) it is more amenable to heating. The other constituent of this oil is linolenic acid which is quite essential for nutrition.

According to the researchers who developed the oil, the idea was to create an oil, whose saturated fat content conforms to the latest medical recommendations, which strongly advocate the replacement of animal fats by vegetable ones so as to contain the risk of cardiovascular ailments.

(P.T.I. Science Service 9(13), 1990, 17)

78 A new indigenous process to refine crude rice bran oil

Bharat Edible Oils and Fats Ltd., Bombay, has developed a new cost-effective process to refine crude rice bran oil into an edible grade oil. The new process can refine crude rice bran containing free fatty acid (FFA) upto 69%.

The new process based on molecular distillation, has undergone pilot tests in West Germany and has been found best suited to Indian conditions, where the FFA of crude rice bran oil is going up to 69%.

The new process apart from eliminating use of hexane and alcohol, has the flexibility to refine any kind of high FFA oils into edible grade unlike the existing processes. The new process is pollution free, reduces the consumption of caustic soda by more than 80%, saves energy upto 70%, and operates at low capital costs.
(Chemical Weekly 35(52), 1990, 93)

279 Hydrothermal treatment to boost soybean oil yields

The yield of soybean oil can be raised by subjecting them to a special hydrothermal treatment, studies at the Central Institute of Agricultural Engineering in Bhopal have shown.

The studies indicate that boiling soybean splits with water for 30 minutes and then sundrying them to get a 7 per cent moisture content gives a maximum oil recovery of some 82 per cent, scientists J Singh and P.C. Bhargale said reporting their work in the Journal of Food Science and Technology.

Although solvent extraction methods are efficient, they do not suit the small scale rural or urban processing centres because they are capital intensive and volume intensive. Moreover some 90 per cent of the total oilseeds are currently being pressed through mechanical screw expellers.

Last year scientists at the CIAE reported that soy splits treated with water sprinkling and conditioned to some 17 per cent moisture yielded 62 per cent oil with minimum specific energy consumption in four to five passes by mechanical processing.

The current studies were designed to improve the oil recovery by subjecting the soybean to various hydrothermal treatments before mechanical screw expression, according to the scientists.

In the process, the soybean is converted into splits free of hulls by a dehuller and the splits are boiled in water for 30 minutes

and later sundried. This has led to a significantly high oil recovery of over 82 per cent, they said.

The residue cake was also of good quality because its antinutritional factors like trypsin inhibitors are inactivated. It is also good in appearance and flavour, the scientists said.
(P.T.I. Science Service 9(16), 1990, 1)

280 Cryogenic grinding of cardamom

Scientists at the Regional Research Laboratory (RRL), Trivandrum, have carried out experiments on very low temperature grinding or cryogrinding of cardamom seeds which improves the quality of cardamom powder by preventing the loss of highly volatile flavour constituents.

If cardamom seeds were ground in an ordinary grinding mill, a temperature of 42 to 95 degree celsius is attained, resulting in considerable (26 to 52 per cent) loss of the volatile oil that gives cardamom its characteristic aroma.

In Indian kitchens cardamom is generally ground for direct use immediately before mixing so that the volatile oil released in the process imparts its aroma to the food. But if the cardamom is used in the form of ready-made powders, the aroma is lost.

Cryogrinding is a practical way to achieve a finely ground product without any loss of flavour. The process, apart from improving the product, is also reported to prevent oxidation and volatilisation of the essential oil, increase the dispersibility of the product, avoid the formation of 'specks' when added to food, and reduce sedimentation in liquid foods and the microbial count. The net result is that the original flavour and quality are retained to a greater extent.

(Deccan Herald 11 October 1990, VI)

281 Wheatless bread

In response to the growing dependence of Third World communities on overseas sources of grain, and the erosion of subsistence agriculture, FAO has been investigating the possibility of making breads from sorghum, cassava and other local starchy foodstuffs.

After about two years of research and development, FAO has come up with recipes for bread which can be made commercially or at home from such tropical staples as rice, millet, maize or sorghum, and from various roots and tubers. The taste and texture of the new products have been well received in the market tests, and their shelf-life has been equal to, or better than, that for bread from wheat.

The recipe given will serve for all types of wheatless bread. The paste is prepared by mixing 400 g of cassava or rice starch in 2200 ml of water, and boiling until translucent followed by cooling.

Batter is prepared by adding to the above mix 2000 g of flour (either rice, maize or cassava), 100 g of sugar, 40 g salt, 40 ml edible oil and mixing. To the above mix is added 25 g of fresh yeast, in 160 ml of water containing 5 g sugar. It is mixed for 5 minutes and batter is poured into baking tin and allowed to rise. Baking is done at 210 C for 35 - 45 min. Users only have to choose the flour most common to their region. This recipe may be divided into five equal portions to produce five loaves. Once baked and cooled, these loaves can be frozen.

For details, contact: Food and Agricultural Industries Service, FAO, Via delle Terme di Caracalla 00100 Rome, Italy.
(Asia-Pacific Tech Monitor May-June 1990, 24)

282 Simple process for iodising salt

The Bhavnagar-based Central Salt and Marine Chemical Research Institute has developed a simple economically viable process for iodising common salt by the "Submersion process".

After experimenting with several iodine compounds, it has been found that potassium iodate is best suited for iodisation of salt because of its relative stability even in tropical climates. It has been reported that under adverse conditions of moisture, heat and sunlight the iodine content of salt iodised with potassium iodate, remains relatively stable compared to potassium iodide which decomposes and imparts yellow colour to salt with substantial loss of iodine. An expert group has said there is no danger of toxic effects if iodates are substituted for iodides in salt iodisation.

In the manual submersion process, salt with 96 per cent sodium chloride content is spread out in submersion tank to make a layer of height 24 to 30 cm. The salt is then submerged in saturated salt solution in which predetermined quantity of potassium iodate is dissolved. The exact quantities of iodating agent to be added depends on the chemical as well as physical property of the salt.

The submerged salt is raked manually for a few minutes and excess brine is discharged to the settling tank. The wet salt is collected and heaped in the tank where it is allowed to drain for about eight hours. The drained liquor is also collected in the same settling tank. The settled brine is pumped back to the storage tank and recycled. The heap after draining is spread on the same platform for solar drying for about 18 hours. The final product contains 30-35 ppm of iodine.

Mechanised submersion process is used for largescale continuous production. The plant consists of belt conveyor, screw conveyor, centrifugal pumps and a grinder of suitable size. Cement tanks and platforms are also constructed. The raw salt is graded and fed to the hopper of counter current screw conveyor. The saturated iodated brine is continuously fed to the base of screw conveyor on salt.

The wet iodated salt containing about 20 per cent brine is dragged by the screw conveyor to the discharge end where it is drop-

ped on continuously moving belt-conveyor which conveys it to the draining platform. The salt is allowed to drain for 6-8 hours and spread for solar drying for 16-18 hours.

Some of the advantages of the submersion process are: (a) It is extremely simple and is suitable for both small and large scale production, (b) Electric power requirement is comparatively low, (c) The process is applicable to any variety of salt like Kurkutch, Badagara etc, (d) The complete mass of salt is submerged in a weak solution of iodating agent, so uniformity of distribution of iodine is well maintained, (e) Once the quality of salt to be iodated is known, single point control is sufficient for quality control (f) To a certain extent, superficial magnesium impurity of the salt crystals can be removed by controlling the magnesium content of the process solution. This helps in increasing the purity of the final product which also increases the stability, and (g) The salt crystals can be ground after iodization without loss of iodine.
(P.T.I. Science Service 9(14), 1990, 3)

283 Coconut water as bottled soft drink

The Phillippines, a leading exporter of copra, has developed a technology to make available coconut water as bottled soft drink. Once pasteurized, the clear sweet liquid is carbonated with food grade carbon dioxide, then aseptically packed and sealed in containers, giving the drink a long shelf-life. A modified process is used to produce a non-carbonated version. The National Institute of Science and Technology, which developed the technique, reports that the beverage retains its natural flavours and contains more nutrients than other soft drinks. Coconut water is a reliable source of potassium for cardiac patients.
(Chemical Weekly 35(43), 1990, 97)

284 Soyabean gaining popularity

The Central Institute of Agricultural Engineering in Bhopal has developed a simple process to remove the undesirable effect of soybean. The process consists of de-hulling, soaking the soy-splits in water, boiling in water for about 15 minutes and drying of cooked splits before they are ground into flour.

The soy flour thus obtained would contain 40 per cent protein and 20 per cent oil. The process also enhances the water absorption capacity of the flour to 200 per cent, as a result of which the dishes made out of it such as chappatis, are softer and easily digestible.

Further, the process takes care of all the anti-nutritional effects including the repulsive beany flavour.

At present, India produces about 1.5 million tonnes of soyabeans from 2.1 million hectares of crop area.

Soya foods like soy flour, soy fortified biscuits, soy flakes and soy badi can be very good supplement to the cereal based Indian diets which are generally deficient in proteins and calories. (Financial Express 4 October 1990, 10)

5 A new synthetic fat substitute

DDM - dialkyl dihexadecymalonate - a fatty alcohol ester of malonic acid and alkylmalonic acids, is being developed as a fat substitute for high temperature applications by Fritto-Lay Inc., 900 North Loop 12, Irving TX 75061 USA.

DDM has been used to produce potato and tortilla chips. Sensory panels, conducted for around one year, show that a blend of DDM and soybean oil used as a frying medium results in potato and tortilla chips that panelists report are equally as crisp as those fried in standard vegetable oils. Panelists also report that finished products made with DDM are less oily than those fried in regular vegetable oils.

The DDM soybean oil blend results in a 33% reduction in calories and a 60% reduction in fat. Feeding studies with rats show that the synthetic fat substitute is minimally digested and that less than 0.1% is absorbed. Testing continues with the synthetic frying oil, while other non-nutritive DDM products are being evaluated in mayonnaise and margarine type products. (Chemical Weekly 35(52), 1990, 92)

Byproducts and Waste Utilization

86 Sugar from jute sticks

A process making jute stick a potential source for sugar production has been developed at the Jute Technological Research Laboratories in Calcutta.

Optimising various parameters like acid strength, solid-liquid ratio, temperature and time, the process uses concentrated sulphuric acid as hydrolysing agent. The yield of reducing sugars from untreated jute stick is 59.8 per cent and from delignified jute stick is 64.7 per cent comparatively favourable with that obtained from hardwoods.

Chemically, jute stick is composed of heterogenous polymer of alpha-cellulose, hemicellulose and lignin. The holocellulose com-

prising the cellulose portions can be converted into sugars by acidic or enzymatic hydrolysis.

The jute stick was crushed into 40-60 mesh size and extracted with alcohol-benzene (1:2) for 10 hours. The defatted jute stick was subjected to acidic hydrolysis.

Primary hydrolysis was carried out by soaking jute stick powder in concentrated sulphuric acid in various concentrations for different periods and temperatures. In primary hydrolysis, the cellulose moiety is hydrolysed to oligosaccharides. In secondary hydrolysis the acid is diluted to 40 times its volume with water to hydrolyse oligosaccharides into monosaccharides.

The residue weight which contains mainly lignin and ash is more or less same in all soaking periods at 40 degrees celsius and above. But at 20 degrees celsius the residue weight decreases with increasing soaking time and the yield of sugars increases with increasing soaking period. This might be due to the fact that at low temperature the breaking of lignin-carbohydrate bond takes much longer time. However, the increase in solid-liquid ratio at lower temperature does not have much effect on yield. But at 40 degrees celsius and above the increase in solid-liquid ratio results in a decrease in the yield which might be due to decomposition of resultant sugars.

The maximum amount of glucose and xylose under optimum conditions is found to be 41.4 per cent and 16.9 per cent respectively from untreated jute stick.

(P.T.I. Science Service 9(14), 1990, 4)

287 Energy from sugarcane waste

The Uttar Pradesh Government has launched a programme for producing alternate source of energy from sugarcane waste in sugar mills.

Co-operative sugar mills have taken keen interest in implementing the scheme, an official spokesman said here on Friday.

An energy producing plant is being installed with the Sheh Road Sugar Mill in Bijnor.

The mill will produce six mw electricity from the sugarcane waste of the mill.

(Financial Express 22 September 1990, 12)

Equipment and Machinery

288 Portable mixers

W P Engineering Works designs and manufactures a wide range of Portable Mixers to help reduce the operation time and power consumption and increase efficiency in mixing, gas absorption, blending, homogenization, heat transfer, solid suspension, dispersion, wet grinding, mass transfer, dissolving, extraction, emulsification, etc. in chemical, petrochemical, dyes and colours and allied industries. These mixers are rigid in construction and easy to operate. The range includes single shaft mixers with propeller, turbine, paddle and anchor type blades. Special purpose mixers are offered on request. The mixers can be supplied in material of construction such as mild steel, stainless steel and nickel, flange mounted with or without stuffing box with dual speed.

For further information write to: W P Engineering Works, 18/19, Ashirwad Indl Est No 3, Ram Mandir Road, Goregaon (W), Bombay 400 104.

(Industrial Products Finder 18(10), 1990, 37)

289 Pouch sealing machine

Sealers India manufactures various types of Pouch Sealing Machines. These machines are used for sealing pouches filled with food or other products. They operate on a low voltage pulse heating, controlled by an electronic timer. The mouth of the filled pouch is inserted between the heating jaws and is pressed, and within a few seconds, the bag is sealed neatly. The machines come with impulse as well as continuous sealing system suitable for virgin as well as laminated pouches. Various models are available: hand operated, light duty; hand operated, heavy duty; foot operated; foot operated with horizontal jaw movement; pneumatically operated; and automatic rotary type pouch sealing machine.

For further information write to: Sealers India, No.10, Kubera Ganapathy Street, Mathiayalagan Nagar, Padi, Madras 600 050.

(Industrial Products Finder 18(10), 1990, 138)

290 Automatic tube filling and sealing/closing machines

Frigmaires Engineers offers automatic tube filling and sealing/closing machines manufactured by Unipac Srl, Italy, for use in chemical, cosmetics, pharmaceutical and food industries. These machines have been constructed following recognised standards and have been designed by considering the highest standards dictated by international rules for the food and pharmaceutical industries. The advanced design features external machine parts in stainless steel or

non-toxic nickel for easy machine cleaning and resistance to wear and pollutants. Sealing/Closing systems are available for metal, plastics, polyfoil and laminate tubes. Models are available for all production requirements. Output varies from 1,000 to 12,000 pieces per hour depending on the model.

For further information write to: Frigmaires Engineers, 2nd floor, Bharat House, 104 Bombay Samachar Marg, Bombay 400 001.
(Industrial Products Finder 18(11), 1990, 24)

291 Rotary powder filling machines

Autopack England offers semi-automatic and automatic rotary powder filling machines having filling speeds of 25 to 100 fills/minute. These machines can handle powder products like milk powder, salts, spices, and other free flowing and non-free flowing powder products. Autopack also offers semi-automatic and automatic liquid filling lines from 100 cc to 200 litres; and multi head selective weigher for frozen foods, vegetables, confectionary, dry foods, snacks, nuts, biscuits, etc. Product is filled by weight with the help of microprocessor based control systems. Linear weighing machines are also offered with vibratory feeders.

For more details write to: Panpack Marketing, Panchal House, P.B. No.48, Station Road, Anand, Gujarat 388 001.
(Chemical Products Finder 9(2), 1990, 70)

292 Biscuit wrapping machine

The MOI BRISK-Biscuit Wrapping machine wraps square and rectangular biscuits into packets of 50 to 100 grams at speeds up to 85 packets per minute. The machine does a single or double wrap of wax coated paper for both inner and outer wraps. Biscuits are fed into a continuous running in-feed conveyor which aligns and pushes them into the single station box along with the inner and outer wax coated paper sheets (fed through the print registration and cutting units). The packet formation is done in the box and the packet is pushed out by conveyor mounting pushers into the top-heating unit. At this stage, the top flap formation and longitudinal sealing are done. The packet is then pushed into the top cooling jacket to firm up the longitudinal seal. The pack is pushed through the side folding and heating units to the side cooling jackets for completion of end sealing and ejected at the end of the pusher mounted conveyor. Standard features are: automatic print registration device to control position of print on the packet; no product, no wrap interlock to prevent paper wastage; digital temperature controllers to minimise variation in heater temperature for even wrapping quality; and automatic counting and feeding system to push the required number of biscuits into the infeed conveyor.

For further information write to: MOI Engineering Ltd., A-7 Industrial Estate, Mohali, Punjab 160 051.
(Industrial Products Finder 18(10), 1990, 31)

293 Mango peeler-slicer

An advanced mango peeler-slicer has been invented at the Queensland Department of Primary Industries agricultural engineering section. Explaining how this invention works, DPI engineer Tom Franklin, Redlands Horticultural Research Station, Brisbane, states: The machine produces peeled and sliced pieces from mango cheeks, which have been cut from whole fruit. Mango cheeks are placed on a belt with the cut surface down and are continuously conveyed into the machine. Very little flesh is left on the skin and all surfaces of the slices are cut, so that their appearance is excellent.

Mr. Franklin points out that "production rates averaged around 400 kg of slices an hour, corresponding to fruit input of 1.2 tonnes an hour". Gordon Young, QDPI engineer believes that the machine will assist in the development of a major mango processing industry. He adds that processed products can be stored for year round use and exported without the quarantine restrictions which inhibit fresh fruit exports.

(ASEAN Food Handling Newsletter No.35, 1990, 4)

294 Quick cleaning pump for the food industry

The Series NL pumps from Netzsch Mohnopumpen GmbH, West Germany, are designed for use in food industry. They can also be used where media are pumped in batches which must not be mixed, eg, paints. These pumps are quick to dismantle and arranged for perfect cleaning. There are no inaccessible places in the conveying space and no hollow shaft. Made from polished or superfinished Cr-Ni-Mo steel, these pumps are available for outputs upto 40 m³/hr, and pressure heads upto 24 bar.

For more details write to: Techman Tara Universal, 308 TTK Road, Madras 600 014.

(Chemical Products Finder 9(3), 1990, 91)

295 Double-cone vacuum driers

Mech-Tech manufactures Double-cone vacuum driers for fast and efficient drying of a wide range of chemical, pharmaceutical and food products. The double-conical vessel with an external jacket for heating ensures direct contact between the material and heated surface. The vessel rotates on its axis resulting in tumbling action of the product inside. This constant movement of the product increases the heat transfer between the heated surface and the product. A high vacuum is maintained throughout the drying process to facilitate full recovery of solvent vapours. Salient features are: uniform temperature throughout the batch eliminates caking; totally sealed and protected from dust and contamination; quick loading and unloading; and low temperature drying retains product characteristics. The driers are available in capacities ranging from 250 to 2,500 litres.

For more details write to: Mech-Tech, P.B. No. 9019, SCB Complex, WE Highway, Goregaon (E), Bombay 400 063.
(Chemical Products Finder 9(1), 1990, 121)

296 Dryers for dehydration of grapes and other food products

Gayatri Industrial Engineers has developed dryers for dehydration of grapes and other food products. The dryer consists of hot air circulation fans, a heating system with steam/electric/oil heaters, an exhaust arrangement and a glass-wool insulated oven. The air flow system gives uniform temperature throughout the drying zone. Designed to give high efficiency drying with minimum losses, the dryer replaces conventional sun drying process by greatly reducing the time for dehydration.

For further information write to: Gayatri Industrial Engineers, A3/002 Govardhan Nagar, LBS Marg, Mulund (W), Bombay 400 080.
(Industrial Products Finder 18(10), 1990, 231)

297 Electric rice cooker

INDO Matsushita Appliances Company Ltd., launched the National Nippo Electric Rice Cooker on May 9, 1990. The company is a joint venture with Matsushita Electric Industrial Company (National) of Japan, the world's largest manufacturer of electrical appliances. The electric rice cooker has a special thermostat invented and patented worldwide by Matsushita which switches automatically to a Keep Warm mode when the rice is done. The cooked rice is then kept hot and ready to serve for up to four hours. The cooker has a thermal fuse for extra safety and the appliance can be opened even whilst cooking. Product tests carried out in December 1989 in Bombay and Madras have met with an overwhelming response and validates market research that revealed a latent demand for this product. The company manufactures the cookers at Cholavaram village in the industrially backward area of Ponneri taluka where Japanese engineers from Matsushita supervise manufacturing activities.

Further information can be had from: Indo Matsushita Appliances Co Ltd., Jhaver Plaza, 2nd floor, 1-A, Nungambakkam High Road, Madras 600 034.

(Industrial Products Finder 18(10), 1990, 87)

298 Convenient electric ice cream maker

Richmond Cedar Works Manufacturing Corporation, USA, has recently introduced a convenient electric ice cream maker. The 5 Quart Frost King Electric Freezer makes 1.89-4.73 litres of ice cream or frozen deserts in 20 - 30 minutes without any cranking. This compact, easy to use freezer, made of real wood and brassed hoops, features a powerful motor with automatic reset and a high impact housing that will not rust, chip or peel. The easy to clean unit comes in 120 V, 60 cycles or 220/240 V, 50/60 cycles.

For further information write to: Richmond Cedar Works Manufacturing Corporation, 400 Bridge St, Danville, VA 24541, U.S.A.
(Industrial Products finder 18(9), 1990, 173)

Packaging

299 Biodegradable plastic

Heinz of the US has come out with a new plastic ketchup bottle specifically designed for the recycling market. The new plastic bottle contains 98.5% polyethylene terephthalate (PET). The remaining 1.5% is an oxygen-barrier material, which makes it safe for highly-sensitive foods like tomato products. Heinz hopes the bottle will be as useful to recycling mills as pure PET. The bottles are expected to hit the market some time next year.

(Chemical Weekly 35(49), 1990, 116)

Commercial Intelligence

Production (Raw Materials)

300 All India final estimate of oilseeds crops: 1988-89

Crop	Area (Thousand Hectares)	Production (Thousand Tonnes)
Groundnut	8430.3	9543.7
Castorseed	635.1	416.5
Sesamum	2432.5	666.6
Rapeseed and mustard	4865.0	4412.2
Linseed	1181.6	349.4
Nigerseed	606.9	173.2
Safflower	781.9	429.1
Sunflower	1052.3	396.8
Soyabean	1654.7	1500.8

(The Oils and Oilseeds Journal 43(1), 1990, 10)

301 Production estimate of spices 1987-88 (Final)

(Production in tonnes)

State	Black Pepper	Chillies	Ginger	Turmeric	Cardamom	Coriander	Garlic
Andhra Pradesh	-	2,61,400	8,570	1,15,200	-	28,200	1,306
Arunachal Pradesh	-	1,004	3,816	500	-	-	-
Assam	-	6,672	-	5,559	-	-	-
Bihar	-	3,511	1,177	5,565	-	3,638	6,477
Gujarat	-	7,100	340	-	-	-	4,700
Haryana	-	4,800	64	-	-	239	23,780
Himachal Pradesh	-	193	303	-	-	-	-
Jammu and Kashmir	-	439	-	-	-	-	100
Karnataka	704	37,403	3,484	18,445	1,549	1,717	2,078
Kerala	48,275	975	42,976	6,161	2,826	-	-
Madhya Pradesh	-	10,719	3,436	357	-	17,795	1,23,387
Maharashtra	-	71,100	589	7,161	-	-	30,500
Manipur	-	3,700	600	-	-	-	-
Meghalaya	-	1,100	30,100	1,800	-	-	-
Mizoram	-	3,300	4,500	-	-	-	-
Nagaland	-	180	70	-	-	-	120
Orissa	-	58,130	7,770	28,918	-	8,300	54,900
Punjab	-	5,200	-	-	-	-	11,002
Rajasthan	-	20,696	560	192	-	1,66,603	19,218
Sikkim	-	-	12,600	-	4,000	-	-
Tamil Nadu	240	23,946	810	91,727	533	13,370	4,932
Tripura	-	700	1,189	1,898	-	-	-
Uttar Pradesh	-	16,002	5,260	514	-	3,065	19,254
West Bengal	-	30,697	7,460	10,700	842	-	-
Delhi	-	26	-	-	-	-	-
Pondicherry	7	47	-	-	-	-	-

(Agricultural Situation in India April 1990, 62-84)

302 Production estimate of coconut and banana, 1987-88 (Final)

State	Coconut*	Banana**
Andhra Pradesh	4,80,046	2,70,000
Arunachal Pradesh	-	5,421
Assam	79,850	4,11,728
Bihar	-	67,482
Goa	1,06,900	-
Gujarat	-	5,12,891
Karnataka	10,91,856	95,030
Kerala	36,69,516	3,61,834
Madhya Pradesh	-	3,03,656
Maharashtra	88,949	13,34,700
Manipur	-	36,210
Meghalaya	-	57,900
Mizoram	-	7,784
Orissa	1,13,660	1,93,220
Tamil Nadu	15,78,300	10,55,277
Tripura	3,342	22,000
Uttar Pradesh	-	13,635
West Bengal	2,48,533	-
Andaman & Nicobar Islands	79,972	17,764
Lakshadweep	24,800	2,700
Pondicherry	22,685	3,233

* Production in '000 nuts

** Production in tonnes

(Agricultural Situation in India April 1990, 54-56, 59-61)

303 Production estimate of tuber crops, 1987-88 (Final)

(Production in tonnes)

State	Potato	Sweet potato	Onion
Andhra Pradesh	6,807	21,700	1,62,500
Arunachal Pradesh	20,700	1,400	-
Assam	3,28,797	27,363	10,660
Bihar	15,32,510	2,93,102	1,34,467
Gujarat	1,97,900	13,332	2,16,200
Haryana	1,54,500	7,236	51,018
Himachal Pradesh	24,952	-	877
Jammu and Kashmir	5,984	-	319
Karnataka	1,94,946	43,999	2,12,040
Kerala	-	33,851	1,625
Madhya Pradesh	3,26,921	39,194	1,96,341
Maharashtra	59,757	78,400	6,30,000
Manipur	20,900	300	-
Meghalaya	1,45,400	13,000	-
Mizoram	982	2,211	-
Nagaland	2,500	600	380
Orissa	78,740	3,51,270	3,19,000
Punjab	5,40,900	673	5,200
Rajasthan	17,132	2,120	75,539
Sikkim	26,400	-	-
Tamil Nadu	1,84,020	42,530	1,63,932
Tripura	46,810	13,533	230
Uttar Pradesh	64,19,368	2,67,410	5,00,596
West Bengal	37,87,016	-	-
Andaman & Nicobar Islands	-	800	-
Delhi	1,343	100	1,890
Pondicherry	-	175	120

(Agricultural Situation in India April 1990, 75-87)

304 Sharp hike in fruit and vegetable production

There has been a substantial hike in the export of fruits and vegetables from a paltry level of Rs. 219 million in 1980 to Rs. 794.8 million in 1989.

Similarly, the production of fruit and vegetable in the country has registered a five-fold increase in the last 20 years from 52,274 tonnes in 1970 to 240,000 tonnes in 1989. The number of licences to fruit and vegetable processing units has increased to 3629 this year as against only 1094 in 1970.

This was disclosed by the Union Food Processing Industries Minister, Mr. Sharad Yadav, while addressing the meeting of the Consultative Committee attached to his Ministry, in New Delhi.

According to the Minister, the present level of annual production of fruits and vegetables in the country is estimated to be of

the order of 70 million tonnes. Out of this, fruit contributes about 33.6 per cent. While fruits and vegetables are mainly in fresh form, only a very small percentage is processed at present.

The present installed capacity of the fruit and vegetable processing industry is estimated at 708,000 tonnes. Even this capacity is not fully utilised and actual utilisation is only around 34 per cent. Besides, fruits and vegetables worth million of rupees are wasted every year.

The Minister said that the industry is largely dependent on exports and this too was limited to a very few markets. Unless the very narrow base of the domestic demand for fruits and vegetables products is broadened, the industry cannot grow and even its export performance is bound to be handicapped.

The fruit and vegetable processing industry has attributed the high prices of its products to the high incidence of taxation and cost of packaging. The incentives provided by the Government to the industry in recent times include a reduction in excise duty on fruit-based drinks and certain spray drying equipment from 15 per cent to 10 per cent. Excise duty on pickles and on kraft paper and kraft paper board used for fruit pack has been abolished. The excise duty on coffee has been reduced to a negligible Rs. 2.50 per quintal from Rs. 78 to Rs. 105 per quintal. The import duty on prawn feed, fish lever oils, stainless steel items for manufacture of machinery, specified machinery/equipment for food processing/marine products and heat recovery system has also been reduced.

The Minister said, to enable the large houses to enter the food processing sector, all the food processing industries except milk-foods, malted foods and flavour have been placed in Appendix I, subject to the reservation for small-scale industries. All packaging industries for food processing, excluding the items reserved for the small sector, have been placed in Appendix I. Similarly, the scheduled industries under Schedule 27(5) and 27(1) of the Industries (Development and Regulation) Act have been broad-banded except those reserved for the small sector.

He said the requirement of the industrial licence under the Industries Act has been dispensed with in order to encourage the growth of fruit and vegetable processing industries.

Referring to the working of the Public Sector Undertakings under the Ministry, the Minister said that the North Eastern Regional Agricultural Marketing Corporation (NERAMAC), set up to foster the growth of horticulture-based industry in the north-eastern region is setting up a pineapple juice concentrate plant at Silchar to process 5,400 tonnes of pineapple annually. It has already set up a fruit-processing unit at Bhagalpur in Bihar with a capacity to produce 1,386 tonnes of mango pulp, 1,320 tonnes of mango juice, 1,440 tonnes of guava juice and 504 tonnes of guava pulp. It is also operating a fruit-based drink bottling unit at Delhi.

Mr. Chandra said that nodal agencies have been set up in almost all the States, for coordinating the activities of food processing

industries. The Ministry has provided Rs. five million as assistance to states to strengthen these nodal agencies.
(Economic and Commercial News 20(37), 1990, 7-8)

Production (Industrial)

305 Indian sugar production

Statement showing number of factories in operation and sugar produced during the seasons 1986-87, 1987-88 and 1988-89 (upto 31.12.1989)

Sl. No.	State/Region	1986-87		1987-88		1988-89	
		No. of Fys. in Operation	Sugar* Produced	No. of Fys. in Operation	Sugar* Produced	No. of Fys. in Operation	Sugar* Produced
1.	Assam	2	5	2	10	2	9
2.	Andhra Pradesh	31	529	31	544	30	507
3.	Bihar	26	299	27	312	27	319
4.	Goa	1	8	1	9	1	9
5.	Gujarat	12	576	11	578	11	578
6.	Haryana	8	289	8	272	8	280
7.	Karnataka	24	612	25	745	26	703
8.	Kerala	2	10	2	7	2	14
9.	Madhya Pradesh	8	71	8	85	8	63
10.	Maharashtra	91	2388	90	2795	95	2629
11.	Nagaland	1	4	1	6	1	5
12.	Orissa	3	21	3	28	5	17
13.	Punjab	11	234	13	210	13	245
14.	Pondicherry	2	59	2	50	2	54
15.	Rajasthan	3	22	2	6	3	14
16.	Tamil Nadu	25	814	25	784	27	1004
17.	East Uttar Pradesh	41	617	41	656	41	620
18.	West Uttar Pradesh	23	823	23	837	23	710
19.	Central U.P.	38	1117	40	1173	39	971
20.	West Bengal	2	4	2	3	1	2
All-India		354	8502	357	9110	365	8753

*(in 000 tonnes)

(The Sugar Technologists Association of India, 52nd Annual Convention Souvenir, 1990)

306 Rice bran oil production

The production of rice bran oil in the country during the last three years has steadily increased to over 316,000 tonnes in 1988-89 as compared to over 290,000 tonnes in 1987-88 and 279,000 tonnes in 1986-87.

It is possible to achieve an additional production of rice bran oil to the extent of 120,000 to 150,000 tonnes, if rice production is integrated with separation of bran in the rice mill and that is used for extraction of oil.

Some of the steps taken to promote rice bran oil in the country include fiscal incentives at the rate of Rs. 5,000 per tonne of rice bran oil used in manufacture of vanaspati has been allowed; fiscal incentives at the rate of Rs. 640 per tonne of rice bran oil used in soap manufacture has been allowed; the Department of Civil Supplies has undertaken a programme of modification of huller rice mills through State Government and through CSIR in which direct assistance of Rs. 5,000 per huller mill is provided and the concessional rate of custom duty has been allowed on import of stabilisers. (Economic and Commercial News 20(27), 1990, 11-12)

307 De-oiled rice bran (rice bran extraction) - Rice Bran Processing, Production and Export during fiscal year 1987-88 and 1989-90 (EST)

Year	Rice Bran Oil Produced				Deoiled Rice Bran Exports	
	Rice Bran Processed M. T.	Edible M. T.	Industrial M. T.	Quantity M. T.	Unit Value per M. T. Rs.	Deoiled Rice Bran used locally (Estimated) M. T.
1987-88	1940500	118650	159400	352750	794	1297000
1988-89	2092250	124650	175500	396450	925	1375000
1989-90	2250000	135000	195000	550000	1000	1370000

(The Oils and Oilseeds Journal 42(7-9), 1990, 28)

308 Minor edible oilseeds collection and production

Commodity	Minor Oilseed Collection & Processing 1989-90 M. T.	Production of oil 1989-90 M. T.	Minor Oilseed Collection & Processing by 1994-95 M. T.	Production of oil by 1994-95 M. T.
Salseed	*1,80,000	23,400	3,00,000	39,000
Mango Kernel	15,000	1,350	75,000	6,750
Mahua	70,000	28,000	1,00,000	40,000

(* Bihar - 20,000, M.P. - 55,000, Orissa - 95,000, U.P. - 8,000 and West Bengal - 2,000 = 1,80,000)

(The Oils and Oilseeds Journal 42(7-9), 1990, 31)

Export

309 Milk powder export under OGL

The Government has allowed export of milk powder (skimmed or full cream) whole and infant milk food by the National Dairy Development Board (NDDB) under open general licence.

Public notices making these amendments in the export policy were issued by the Chief Controller of Imports and Exports on August 10. (Economic and Commercial News 20(35), 1990, 9)

310 NDDB to export milk powder to Australia

The National Dairy Development Board (NDDB), has concluded an agreement with Agrifoods Marketing International Pvt Ltd of Melbourne, for exporting 15,000 tonnes of skimmed milk powder.

The contract was signed at Anand by Dr. Amrita Patel, Managing Director of NDDB, and Mr. G.J. Mc-Hugh, Director of Agrifoods Marketing International Pvt. Ltd. This is for the first time that India will be commercially exporting milk powder to any country.

According to the terms of the agreement, the initial consignment will be of 3,000 tonnes. After clearance from Agrifoods for quality another 7,000 tonnes would be despatched. An additional 5,000 tonnes will be shipped not later than March 1991 subject to mutual agreement of both parties in regard to price and successful completion of the earlier consignments.

Now, apart from Australia, countries like Nepal, Bangladesh, USA and organisations like the International League of Red Cross have evinced keen interest in buying Indian milk powder. The World Food Programme is also interested. There is even commitment for export to EEC countries.

(Financial Express 27 September 1990, 2)

311 Air freight subsidy on export of cardamom

The Centre has decided to give air freight subsidy at the rate of Rs. 7.25 per kg on exports of cardamom (small) in consumer packs of two kg and less to the Gulf and West Asian markets.

This will be applicable to exports effective from Friday and to January next, a Spices Board press release said.

The payment of subsidy will be made by the board on getting the relevant documents. The scheme will stop once 300 tonnes exports by air have been achieved, or the price begins to rise indicating shortage in West Asian and Saudi markets, the release said.
(Financial Express 16 September 1990, 10)

312 Growth in marine products export

India exported 110,788 tonnes of marine products valued at Rs. 634.76 crores during 1989-90 registering a growth of 11.04 per cent in quantity and 6.17 per cent in value over the previous year's export.

However, the unit value declined to Rs. 57.29 from last year's Rs. 59.92 mainly due to price decline for shrimp in the international market, according to the Marine Products Export Development Authority (MPEDA) here.

While Japan remained the single largest market for Indian marine products, the share of Japan registered a marginal decline during 1989-90.

Exports to the United States and European Economic Community registered growth both in terms of volume and value.

As usual shrimp dominated and accounted for 52 per cent of the volume and 73 per cent of the value.

Lobstertails, frozen cuttlefish, fresh and frozen fish were other items which registered a growth rate in export during the year under review.

India also exported dried fish, shark fins, fish maws, lobsters, crabs, aquarium fish, fish pickles, sea fans, seadragon, frozen oysters and frozen boiled clams.

(Financial Express 4 September 1990, 10)

13 Basmati rice export

The Association of Basmati Traders of America has called for a major effort to introduce the high quality basmati rice to the non-ethnic American consumer.

The association has also suggested formation of an all-India rice board on the lines of Tea Board to tap enormous potential in the US.

The association favours selling basmati through super markets in small consumer packages under Indian brand names as there is a vast scope for basmati in the US.

With a good marketing and advertising strategy, it says, India could easily increase the exports of basmati from present 33000 to 300,000 tonnes. At present, India exports 300,000 tonnes of rice to West Asia but in the US, it could get much higher prices.

The major hindrance in selling basmati rice in the US, according to the association, is quality control and the fact that Indian basmati rice needs to be cleaned and soaked before being cooked.

The Secretary of the association, Mr. Prakash Shilkar, says India will have to use modern machinery to remove these two problems but investment will pay off soon.

Besides, he says the association has developed after extensive tests, a simple reliable procedure which gives exact basmati-non basmati percentage in a sample.

(Financial Express 21 August 1990, 10)

4 Tea exports

The country had reported Rs. 900 crore worth of tea last year, and the exports were expected to go up over Rs. 100 crore this year. He said the demand abroad was for value-added tea and satches, and not pulp tea.

(The Economic Times 7 September 1990, 14)

15 Cadbury plans to boost export of cocoa bean

Cadbury India Ltd proposes to maximise exports of cocoa bean.

The company had presented a paper to the Union Government on a strategy for earning Rs. 250 crores per annum foreign exchange by 2000 AD.

As much as 80 per cent of cocoa was grown in Kerala while Tamil Nadu and Karnataka accounted for the rest. Efforts are on by the company to grow cocoa in Andhra Pradesh also.

Out of the 6000 tonnes produced in the country, Cadbury consumption accounted for 80 per cent of which 1000 tonnes was exported by them in order to reduce the inventory cost.

(Financial Express 1 August 1990, 4)

316 CCS on industrial alcohol off

Cash compensatory support (CCS) on export of industrial alcohol has been withdrawn.

A CCS of 10 per cent has introduced with effect from April 1, 1989, for a period of three years subject to a review after one year.

The Government has now withdrawn the incentive because alcohol-consuming industries in deficit states like Gujarat, Karnataka and Kerala are not getting their supplies. Even distillers in surplus States of Uttar Pradesh and Tamil Nadu are keen on exports.

The Government had authorised All-India Distillers Association to export, only part of the quantity allotted by the Government. The unutilised allocation of the previous year had been added to this year's allocation.

AIDA has been championing exports in view of the attractive international price and the incentive of cash assistance. AIDA can continue to export but new exports will not be eligible for CCS.
(Financial Express 27 July 1990, 1)

317 Ceiling on export of wheat products

The government has placed a ceiling on the export of wheat products at the disposal of the Agricultural and Processed Food Products Export Development Authority (APEDA).

According to a public issue by the chief controller of imports and exports on July 19, exporters are required to register their contracts backed by 100 per cent irrevocable letters of credits with APEDA.

APEDA will not allocate more than 10 per cent of the total available ceiling to any individual exporter. It will allocate the ceiling after 15 days from July 19.

The wheat products include raw resultant atta, maida, suji and wholemeal atta (wheat flour of not less than 95 per cent extractions).

On fulfilment of the conditions, APEDA will issue ceiling slip to the exporters on a first-come, first-served basis indicating full particulars such as the name of the exporter, number and date of export order-contract and irrevocable letter of credit, quantity allowed, FOB value and the destination.

APEDA will send the ceiling advice to the concerned port licensing authority.
(The Economic Times 26 July 1990, 6)

18 Registration norms amended for exporters

The Government on Friday said that relevant provisions requiring registration with the export promotion councils and commodity boards as well as with the Federation of Indian Export Organisations (FIEO) have been amended.

An exporter of multiple products whose f.o.b. value of exports in the preceding licensing year is more than Rs. 10 lakhs now has an option to get registration with each of the concerned export promotion councils or commodity boards.

In such a case, the exporter need not obtain registration with FIEO.

The Minister said that the Government had received representations from the exporting community regarding the difficulties faced by them as a result of the import and export policy requirement to compulsorily register themselves with FIEO for exports of more than Rs. 10 lakhs annually.

The decision to amend the provision has been taken in response to such representations.
(Financial Express 12 August 1990, 3)

9 Export inspection council revamped

Union commerce minister Arun Nehru has reconstituted the export inspection council by inducting five non-official members, reports UNI.

They are the chairmen of the engineering export promotion council, chemicals and allied products export promotion council, council for leather exports and the Indian jute mills association and the president of sea food exporters' association.

The export inspection council was set up under the Export (Quality Control and Inspection) Act, 1963, with a view to advising the Central government regarding measures for enforcement of quality control and inspection in relation to the commodities notified for exports.

The council is headed by special secretary, ministry of commerce, and consists of eight non-official members and eleven official members representing various ministries of the government and technical institutions.

(The Economic Times 15 August 1990, 1)

320 Move to close promotional offices may hit exports

The reported decision of the Centre to shut down promotional offices abroad as an austerity measure would act as a deterrent to Indian exports at large, reports PTI.

The Tea Board workmen's association apprehends that even Tea Board offices would not be spared the hatchet in this regard.

When contacted, Mr P.K. Bora, the Tea Board chairman, said that he was not aware of any such move to close down the Tea Board offices.

But even Mr. Bora agreed that a move in this direction especially in the markets where tea export prospects were promising would have adverse effect on exports.

According to the Tea Board workmen's association, the government decision to 'amputate the promotional limbs' of the Tea Board would enable other exporting countries to take advantage of a favourable market situation in major tea importing countries.

In this context, a spokesman of the association said that following the launching of the Darjeeling and Assam logo by the board, the potential of Indian tea was expected to improve further in UK and several European countries.

Referring to the report on the long-term strategy and plan for tea, the association said that the report has suggested extensive promotional campaign of value added teas in Gulf countries, north African countries, Australia, Japan, UK and West Europe.
(The Economic Times 16 July 1990, 3)

Import

321 Dry fruit imports

The import replenishment licences issued against export of apricot kernels/walnut kernels have been made valid for import of dry fruits up to their full value.

A public notice amending the policy was issued by the chief controller of imports and exports on July 20.

Earlier, export of apricot kernels/walnut kernels qualifying for import replenishment licences, were valid for import of dry fruits

upto two percent of the value of such licences, subject to a maximum of Rs. 1 lakh.
(The Economic Times 26 July 1990, 6)

2 Edible oil import

Detailing measures to improve the availability of oils and maintain the prices, Mr. Mirdha said that the allocation of imported oils through the Public Distribution System has been stepped up from 35,000 tonnes in March 1990 to 92,000 tonnes in September, 1990. He said that the blending of one conventional edible oil with one refined non-conventional oil has been permitted. This has led to the additional production to the tune of over 100,000 tonnes of edible oils this year. It has also helped in boosting exports realisation in the field of oilseeds and deoiled meal has gone up from Rs. 2177.5 million in 1987-88 to Rs. 5950 million in 1989-90.

The Hindustan Vegetable Oils Corporation, a public sector undertaking of the Government of India is shortly introducing the blend of groundnut oil and cotton-seed oil with the brand name "SANGAM".

(Economic and Commercial News 20(37), 1990, 9-10)

Trade Information

Food industry seeks duty relief

The All India Food Preservers' Association has demanded removal or at least cut in the import and excise duties on packing material used by the food and vegetable industry. The organisation has also pleaded for removal of sales tax, local taxes and octroi on the industry's finished products. The organisation has pointed out that the packing cost often exceeds the cost of the product itself as far as the food industry is concerned.

(Chemical Products Finder 9(2), 1990, 132)

Maharashtra withdraws ST on gur

Maharashtra minister of state for finance Arun Gujarati yesterday announced in the legislative council the withdrawal of the proposed two per cent sales tax on gur.

(The Economic Times 10 August 1990, 2)

325 Copra floor price raised

The minimum support price (MSP) for average quality copra has been raised by Rs. 100 per quintal to Rs. 1,600 per quintal for 1990.

The Commission for Agricultural Costs and Prices (CACP) had earlier fixed MSP for copra at Rs. 1,500 per quintal, the Minister of State for Agriculture, Mr. Nitish Kumar, told the Rajya Sabha members on Friday.

Meanwhile, the estimated production during 1988-89 of oil from trees of forest origin is 1.5 lakh tonnes. The average percentage of oil recovery ranged from 12.5 per cent in the case of sal to 35 per cent in the case of mahua.

The Ministry of Welfare has been entrusted with the task of increasing the collection, processing and development of oilseeds of trees of forest origin.

(Financial Express 18 August 1990, 1)

326 Schemes to boost food processing units

The Ministry of Food Processing Industries has chalked out schemes to promote the growth of food processing industries in the current year. Schemes for strengthening linkages between growers and processors of fruits and vegetables have been undertaken. Other steps include strengthening of quality control and development of infrastructural facilities. Schemes have also been proposed for processing of poultry and modernisation of grain milling industry for effective utilisation of its by-products. Three development councils have been set up under the Ministry to identify the problems and constraints faced by the different sectors of the food processing industries.

(Industrial Products Finder 18(9), 1990, 91)

327 Two edible oil units in Tamil Nadu likely

Two edible oil factories for producing oil from paddy bran are to be set up in Tamil Nadu, Mr. J.V. Sankar, Joint Commissioner, Civil Supplies Corporation, said on Sunday.

One of the factories would be located in Purumkulam in Thanjavur district, he told PTI here. The site for the second one was under consideration.

Consumer dispute forums would be set up in every district under the chairmanship of district judges. The forum would comprise three members. Petitions filed by consumers before this forum would be disposed of within three months, he added.

(Financial Express 20 August 1990, 1)

28 Searle India to launch aspartame

Searle India Ltd plans to launch equal, G.D. Searle's global brand of aspartame, by year-end.

Aspartame, a synthetic sugar, is an original discovery of G.D. Searle. Like other existing companies which market the product, Searle India too plans to import aspartame and formulate the chemical into table top products.

The market for synthetic sweeteners is estimated around Rs. 2 crore at present. There are four versions of aspartame in the market. The leading ones being Sugarfree of Cadila and One Up of Torrent Laboratories.

Worldwide, table top accounts for only 20 per cent of aspartame sales, the lion's share going into foods and beverages. Diet Coke and a host of other beverages and food products abroad are sweetened with aspartame.

Unlike sacharin, which cannot be metabolised by the body, aspartame is a protein which is metabolised like any other protein within the body. One spoon of sugar has 16 calories. In contrast, one tablet of aspartame has only 0.4 calories for equivalent sweetness. (The Economic Times 22 September 1990, 3)

29 Lipton to focus on food and beverage

Lipton India Ltd is concentrating on development of products in the food and beverage areas, particularly those based on milk and agricultural produce. In carrying out its R&D activities, Lipton is drawing upon the facilities of Unilever as also Hindustan Lever, which has a well-equipped research centre at Andheri in Bombay. The company plans to make additional investments in setting up facilities that will help reduce energy consumption. (Chemical Products Finder 9(2), 1990, 140)

30 Plea for talks on coffee pact

Coffee producing nations have made a forceful plea at the recent International Coffee Council (ICC) meet for early negotiations on a new agreement with economic provisions and for reintroduction of quotas from next year.

According to the Coffee Board Chairman, Mr. P.K. Ramaiah, who returned after attending the 56th session of ICC held at London from September 17 to 28, producers including Columbia and the African countries, with the notable exception of Brazil, have appealed strongly for the constitution of a negotiating group.

He said India too desired immediate negotiations for new agreement with economic clauses. Although some of the consuming members sympathised with the sufferings of producers, the US, like Brazil, desired an additional extension of the 1983 agreement without economic clauses for one more year up to September 1992, he added.

According to Mr. Ramaiah, the reason given in support of extension of the agreement is that a free market for one year was not sufficient to assess the reaction of the market. Therefore, extension by one or two years more was considered essential to make a sound evaluation of the situation.

He said a reconciliation could be brought about by the exporting and importing members resulting in the adoption of a resolution by the Council extending the 1983 agreement.

Mr. Ramaiah said concurrent to the ICC meeting, ICO's executive board and the promotion committee also met. Besides the plenaries of the producers and the consumers, various regional groups also held their meetings.

(Financial Express 5 October 1990, 1)

331 Tea Board offices abroad

The government will save up to Rs. 3.5 crore as a result of closure or rationalisation of the functioning of tea board offices abroad and the takeover of marketing by the Bharat Business International Limited (BBIL), commerce minister Arun Nehru said.

He said the 12 offices abroad dealing with different commodities were being closed or merged with other office to reduce costs and avoid duplication of activity.

(The Economic Times 7 September 1990, 14)

Food Regulation, Quality Control & Hygiene

332 Central Excise on pickles and others

G.S.R. 152(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986), specified in the corresponding entry in column (2)

of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) there of:-

Sl.No.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	2001.10	Pickles	Nil
2.	2001.10	All goods other than those specified as S.No.1 above	10% ad valorem

(The Gazette of India Part II- Section 3 Sub-section (i), No.113, 1990, 7)

3 Central excises on ice-cream

G.S.R. 153 (E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government being satisfied that it is necessary in the public interest so to do, hereby exempts ice-cream falling under heading No. 2105.00 of the Schedule to the Central Excises Tariff Act, 1985 (5 of 1986), manufactured in hotels and restaurants and sold in retail in the same premises where such ice-cream is manufactured from the whole of the duty of excise leviable thereon which is specified in the said Schedule.

Explanation - For the purpose of this notification "ice-cream" means those preparations which are commonly known as ice-cream or kulfi and in the preparation of which milk, cream or any other product of milk is used.

[No. 334/10/89-TRU]

(The Gazette of India Part II - Section 3 - Sub-section (i) No.113, 1990, 7-8)

4 Central Excise exemption

G.S.R. 154(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986) specified in the corresponding entry in column (2) of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) thereof:-

TABLE

Sl.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	2101.30	All goods	Nil
2.	2103.11	Chutney	Nil
3.	2103.19	All goods	Nil
4.	2105.00	Ice-cream	10% advalorem
5.	2105.00	Goods other than those specified at S.No.4	Nil
6.	2106.90	All goods	Nil
7.	2107.91	Soya textured protein	Nil
8.	2107.91	Papad, idli-mix, vada-mix dosa-mix, jalebi-mix, gulab-jamun-mix or namkeens, such as bhujiya, chabena	Nil

Explanation - For the purpose of this notification "ice-cream" means those preparations which are commonly known as ice-cream or kulfi and in the preparation of which milk, cream or any other product of milk is used.

(The Gazette of India Part II - Section 3 -Sub-section (i) No.11/1990, 8-9)

335 Central Excise amendment

G.S.R. 214(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby makes the following further amendment in the notification of the Government of India in the Ministry of Finance (Department of Revenue) No.160/86-Central Excises. dated the 1st March, 1986, namely:-

In the Table annexed to the said notification for S.No. 5 and entries relating thereto, the following S.No. and entries shall be substituted, namely:-

1	2	3	4
"5.	85.09 85.10 or 85.16	(a) Domestic electrical appliances, the following namely:- (i) Vacuum cleaners; (ii) Floor polishers; (iii) Grinders and mixers; (iv) Juice extractors; (v) Cream Whippers and egg beaters; (vi) Geysers and water heaters, all types, but excluding immersion heaters;	Twenty per cent ad valorem

(vii) Shavers;	
(viii) Hair dryers, hair curlers, permanent waving apparatus and curling tong heaters;	
(ix) Steamers, coffee makers (including percolators of the domestic type), cookers, egg boilers;	
(x) Hot plates, grillers, boiling plates, plate warmers, food warming trays, food warming trollies, hot food cabinets;	
(xi) Coffee roasting appliances;	
(xii) Room heaters fitted with air circulation device;	
(xiii) Ice cream churners;	
(xiv) Domestic ovens (other than micro oven) of all types;	
(xv) Rectangular Beverage Jug (hot),	
(b) Cooking ranges	Twenty five per cent ad valorem
(c) Microwave Ovens	Twenty five per cent ad valorem
(d) Other domestic electrical appliances	Nil
(e) Goods other than domestic electrical appliances	Twenty per cent ad valorem
(f) Parts	Twenty per cent ad valorem".

(The Gazette of India Part II - Section 3 -Sub-section (i)
No.113, 1990, 96)

336 Prevention of Food Adulteration Rules 1955 (Amendment)

G.S.R. 457(E) - Whereas certain draft rules further to amend the Prevention of Food Adulteration Rules 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954), with the notification of Government of India, in the Ministry of Health and Family Welfare (Department of Health) No. GSR 1066(E) dated the 27th December, 1989 in the Gazette of India, Extraordinary, Part II Section 3, Sub-section (i), dated the 27th December 1989, at pages 1-6, inviting objections and suggestions from all persons likely to be affected thereby before the expiry of sixty days from the date of which copies of the Gazette of India in which the said notification was published, were made available to the public;

And whereas the copies of the said notification were made available to the public on 15th January 1990.

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government, after consultation with Central Committee for Food Standards, hereby

makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely:-

RULES

1. These rules may be called the Prevention of Food Adulteration Fourth (Amendment) Rules, 1990.

2. They shall come into force on the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 (hereinafter referred to as said rules) -

"(i) for clause (zz) of rule 42, the following clause shall be substituted namely:-

"(zz) Every package containing an admixture of edible oils shall carry the following label, namely:-

This blended edible oil contains an admixture of -

(i) -----% by weight
(ii) -----% by weight
(Name of oils)
Date of packing -----

(ii) In rule 44 of the said rules, for the seventh proviso, the following proviso shall be substituted, namely:-

Provided also that the prohibition in clause (a) shall remain inoperative in respect of the admixture of non-conventional edible oil (that is to say, cotton seed oil, rice bran oil or soyabean oil or sunflower oil or sunflower oil conventional edible oils (that is to say, coconut oil, groundnut oil, mustard oil or til oil) where --

(a) the proportion of conventional oil, (that is to say, coconut oil, groundnut oil, mustard oil or til oil) in the admixture is not less than 20 per cent by weight;

(b) the admixture of edible oils is processed and sold by the Department of Civil Supplies, Government of India (Directorate of Vanaspathi, Vegetable Oils and Fats), or the authorized agencies of that Department and the State Cooperative Oilseeds Growers Federation set up under National Dairy Development Board's Oilseed and Vegetable Oil Project in sealed packages weighing not more than 5 kgs, under Agmark certification mark compulsorily and bearing the label declaration as laid down in clause (ZZ) of rule 42;

(c) the quality of each edible oil used in the admixture conforms to the relevant standard prescribed by these rules".

(iii) in Appendix 'B' of the said rules, for item A.17.24, the following item shall be substituted, namely:-

"A. 17.24 - Blended edible oil means a mixture of two vegetable oils. The blend shall be admixture of a conventional raw edible oil (that is to say, coconut oil, groundnut oil, mustard oil or til oil) obtained by mechanical expression, with a non-conventional edible refined oil (that is to say, cotton seed oil, rice bran oil or soya-bean oil or sunflower oil or safflower oil) in which the proportion of conventional oil shall not be less than 20 per cent by weight. The individual oil in the blend shall conform to the respective standards prescribed by these rules. The blend shall not contain any imported oil. It shall not be sold in loose form. It shall also not be sold under the common or generic name of oils used in the blend but may be sold as "Blended Edible Oils" and shall bear the label declaration as laid down in clause (ZZ) of rule 42. The blend shall be clear, free from rancidity, suspended or insoluble matter or other foreign matter, separated water, added colouring matter, flavouring substances, mineral oil, any other animal and vegetable oils, or fats, argemone oil, hydrocyanic acid, castor oil and tricresyl phosphate. It shall also conform to the following standards, namely:-

- (a) Moisture and volatile matter
 - Not more than 0.2 per cent by weight
- (b) Acid value
 - Not more than 2.0
- (c) Unsaponifiable matter
 - (i) Blend with rice bran oil
 - Not more than 3.00 per cent by weight
 - (ii) Blend with other edible oils
 - Not more than 1.00 per cent by weight
- (d) Flash point (penske-Martin closed method)
 - Not less than 250°C

(The Gazette of India Part II - Section 3 - Sub-section (i) No. 167, 1990)

7 Prevention of Food Adulteration Rules 1955 (Amendment) 1990

G.S.R. 445(E) - Whereas certain draft rule further to amend the Prevention of Food Adulteration Rules, 1955 were published as required by sub-section (1) of section 23 of Prevention of Food Adulteration Act, 1954 (37 of 1954), in the notification of Government of India in the Ministry of Health and Family Welfare (Department of Health) No. GSR 769 (E) dated the 21st August 1989 in the Gazette of India, Extraordinary, Part-II Section 3, Sub-section (i), dated the 21st August, 1989 at pages 1-16, inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of sixty days from the date on which copies of the Gazette of India in which the said notification was published, was made available to the public;

And whereas the copies of the said Gazette were made available to the public on 20th September, 1989.

And whereas the objections and suggestions received from the public on the draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) of section 23 of the said Act, the Central Government after consultation with the Central Committee for Food Standards, hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955 namely:-

RULES

1. (1) These rules may be called the Prevention of Food Adulteration (Third Amendment) Rules, 1990.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Prevention of Food Adulteration Rules, 1955 in rule 65, in the Table, after serial number 31 and entries relating thereto, the following serial numbers and entries shall respectively be inserted, namely:

Sl.	Name of Insecticide	Food	Tolerance limit mg/kg (ppm)
32	Acephate	Safflower seed Cotton seed	2.0 2.0
33	Methamido-phos (A metabolite of Acephate)	Safflower seed Cotton seed	0.1 0.1
34	Aldicarb (sum of Aldi- carb, its sulphoxide and sulphone, expressed as Aldicarb)	Potato Chewing Tobacco	0.5 0.1
35	Atrazine	Maize Sugarcane	0.25 0.25
36	Carbendazim	Foodgrains Milled foodgrains Vegetables Mango Banana (whole) Other fruits Cotton seed Groundnut Sugar beet Dry fruits Eggs Meat and Poultry Milk and Milk Products	0.50 0.12 0.50 2.00 1.00 5.00 0.10 0.10 0.10 0.10 0.10 0.10 (shell free basis) 0.10 (Carcass fat basis) 0.10 (Fat basis)

37	Benomyl	Food grains	0.50
		Milled foodgrains	0.12
		Vegetables	0.50
		Mango	2.00
		Banana (whole)	1.00
		Other fruits	5.00
		Cottonseed	0.10
		Groundnut	0.10
		Sugarbeet	0.10
		Dry fruits	0.10
		Eggs	0.10
			(shell free basis)
		Meat and Poultry	0.10
			(carcass fat basis)
		Milk and Milk Products	0.10
			(fat basis)
38	Captan	Fruit and Vegetable	15.00
39	Carbofuran (sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)	Foodgrains	0.10
		Milled foodgrains	0.03
		Fruit and Vegetables	0.10
		Oil Seeds	0.10
		Sugarcane	0.10
		Meat and Poultry	0.10
			(carcass fat basis)
		Milk and Milk Products	0.05
			(fat basis)
40	Copper Oxychloride (determined as Copper)	Fruit	20.00
		Potato	1.00
		Other vegetables	20.00
41	Cypermethrin (sum of isomers) (fat soluble residue)	Wheat grains	0.05
		Milled wheat grains	0.01
		Brinjal	0.20
		Cabbage	2.00
		Bhindi	0.20
		Oil seeds except groundnut	0.20
		Meat and Poultry	0.20
			(carcass fat basis)
		Milk and Milk Products	0.01
			(fat basis)
42	Decamethrin/ Deltamethrin	Cotton seed	0.10
43	Edifenphos	Rice	0.02
		Ricebran	1.00
		Eggs	0.01
			(shell free basis)
		Meat and Poultry	0.02
			(carcass fat basis)
		Milk and Milk Products	0.01
			(fat basis)

44	Fenthion (sum of fenthion, its oxygen analogue and their sulphoxides and sulphones, expressed as fenthion)	Foodgrains	0.10
		Milled foodgrains	0.03
		Onion	0.10
		Potatoes	0.05
		Beans	0.10
		Peas	0.50
		Tomatoes	0.50
		Other Vegetables	1.00
		Musk melon	2.00
		Meat and Poultry	2.00
		(carcass fat basis)	
45	Fenvalerate (fat soluble residue)	Milk and Milk Products	0.05
		(fat basis)	
		Cauliflower	2.00
		Brinjal	2.00
		Okra	2.00
		Cotton seed	0.20
		Cottonseed oil	0.10
		Meat and Poultry	1.00
		(carcass fat basis)	
		Milk and Milk products	0.01
		(fat basis)	
46	Dithiocarbamates (the residue tolerance limit are determined and expressed at mg/CS ₂ /kg and refer separately to the residues arising from any or each groups of dithiocarbamates (a) Dimethyldithiocarbamates residue resulting from the use of ferbam or Ziram and, (b) Ethylene bis-dithiocarbamates resulting from the use of mancozeb, maneb or Zineb (including zineb derived from nabam plus zinc sulphate)	Foodgrains	0.20
		Milled foodgrains	0.05
		Potatoes	0.10
		Tomatoes	3.00
		Cherries	1.00
		Other fruits	3.00
47	Phenthoate	Foodgrains	0.05
		Milled foodgrains	0.01
		Oilseeds	0.03
		Edible oils	0.01
		Eggs	0.05
		(shell free basis)	
		Meat and Poultry	0.05
		(carcass fat basis)	
		Milk and Milk Products	0.01
		(fat basis)	

48	Phorate (sum of phorate, its oxygen analogue and their sulphoxides and sulphones, expressed as phorate)	Foodgrains	0.05
		Milled foodgrains	0.01
		Tomatoes	0.10
		Other vegetables	0.05
		Fruits	0.05
		Oil seeds	0.05
		Edible oils	0.03
		Sugarcane	0.05
		Eggs	0.05
		(shell free basis)	
		Meat and Poultry	0.05
		(carcass fat basis)	
		Milk and Milk Products	0.05
		(fat basis)	
49	Simazine	Maize	0.13
		Sugarcane	0.25
50	Pirimiphos-methyl	Rice	0.50
		Wheatgrains	5.00
		Milled wheat grains	2.50
		Eggs	0.05
		(shell free basis)	
		Meat and Poultry	0.05
		(carcass fat basis)	
		Milk and Milk Products	0.05
		(fat basis)	

(The Gazette of India Part II - Section 3 -Sub-section (1) No.156, 1990)

338 Central Excises Exemption

G.S.R. 15(E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises Salt Act, 1944 (1 of 1944), the Central Government being satisfied that it is necessary in the public interest so to do, hereby exempts goods specified in column (3) of the Table hereto annexed and falling under the sub-heading No. of the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986), specified in the corresponding entry in column (2) of the said Table from so much of the duty of excise leviable thereon which is specified in the said Schedule as is in excess of the amount calculated at the rate specified in the corresponding entry in column (4) thereto:-

TABLE

Sl. No.	Sub-heading No.	Goods	Rate
(1)	(2)	(3)	(4)
1.	1901.90	All goods other than (i) malt extract or (ii) food preparations containing malt or malt extract or cocoa powder in any propor- tion	Nil
2.	1902.10	Seviyan (Vermicilli)	Nil
3.	1903.10	Sago	Nil
4.	1903.10	All goods other than that at Sl. No.3	10% ad valorem

(The Gazette of India Part II - Section 3 -Sub-section (i)
No.113, 1990, 6)

339 Khandsari production and sales - Rules

G.S.R. 456 (E) Ess. Com./Sugar - In exercise of the powers conferred by clause 5 of the Sugar (Control) Order, 1966, the Central Government hereby directs that every producer of Khandsari (open pan sugar) shall -

(1) declare his opening stocks of khandsari as on 30th April, 1990 and also the quantity produced in each month thereafter till the 30th September, 1990 to the specified authority;

(2) sell and despatch not less than 30 per cent, of the stocks as on 30th April 1990 declared in accordance with the provisions of paragraph (1) during each of the months of May and June, 1990;

(3) furnish particulars of stocks, production, sales and despatch of khandsari for each month latest by the 7th day of the following month to the specified authority.

Provided that the opening stocks of khandsari as on the 30th April, 1990 shall be declared on or before 7th May 1990.

EXPLANATION - For the purpose of this order, "Specified authority" means the Collector of the District in which the producer's khandsari unit is located or such other authority as the State Government may specify in this behalf.

2. This order shall come into force at once.
(The Gazette of India Part II - Section 3 - Sub-section (i) No. 166, 1990)

340 Vegetable Oils Grading and Marking (Amendment) Rules 1990

G.S.R. 289 - Whereas draft of the Vegetable Oils Grading and Marking (Amendment) Rules, 1989, which the Central Government proposes to make amendment to the Vegetable Oils Grading and Marking Rules, 1955, was published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act 1937 (1 of 1937), under the notification of the Government of India Ministry of Agriculture, Department of Rural Development in the G.S.R. 350 dated the 19th April, 1989, on pages 1179 to 1181 of the Gazette of India, Part II, Section 3, Sub-section (i) dated the 13th May 1989, inviting objections and suggestions from all the persons likely to be effected thereby, before the expiry of the period of forty-five days from the date on which copies of the official Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 30th May 1989;

And whereas the objections/suggestions received in respect of the said draft rules have been considered by the Central Government,

Now, therefore in exercise of the powers conferred by section 3 of the said Act, the Central Government hereby makes the following rules further to amend the Vegetable Oils Grading and Marking Rules, 1955, namely:-

RULES

1. These rules may be called the Vegetable Oils Grading and Marking (Amendment) Rules, 1990.

2. They shall come into force on the date of their publication in the Official Gazette.

3. In the Vegetable Oils Grading and Marking Rules, 1955 -

(a) in schedule II(d), for serial number (vi) and the entries relating thereto, the following serial number and entries shall be substituted namely: -

"(vi) Castor Oil

Medicinal.....Mauva
Firsts Special.....Red
Commercial Grade-I...Blue
Commercial Grade II...Yellow",

(b) for schedule IX, the following Schedule shall be substituted namely:-

SCHEDULE-IX
(See rules 3 & 4)
AGMARK GRADE DESIGNATION AND DEFINITIONS OF QUALITY
FOR CASTOR OIL

Grade designation	Description	Clarity in height of column of oil in cms. through which Bourgois print can be read in 100 ml Nessler tube	Colour on Lovibond scale expressed as Y+5R (Maximum)
1	2	3	4
Medicinal*	The oil shall be the refined fixed oil obtained by cold expression of castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	10.0	3.5 (in 1 "Cell)
Firsts Special	The oil shall be the refined fixed oil obtained from castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	10.0	3.7 (in 1" Cell)
Commercial Grade-I	The oil shall be the fixed oil obtained from castor seed (Ricinus communis). It shall be free from admixture with other oil or substance and also free from sediments and suspended matter.	5.0	30.0 (1/4" Cell)
Commercial Grade-II	-do-	-	40.0 (in 1/4" Cell)

Specific gravity at 30 C/30 C	Refractive index at 40 C	Saponification value	Iodine Value (Wijs method)	Acetyl Value (minimum)	Saponifiable matter (Percent (Maximum))	Acid Value (Maximum)
5	6	7	8	9	10	11
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	142	0.0	2.0
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	143	0.8	2.0
0.954 to 0.960	1.4700 to 1.4740	176 to 187	82 to 90	143	1.0	4.0
0.954 to 0.960	1.4700 to 1.4800	176 to 187	82 to 90	143	1.0	6.0

Critical solution temperature in alcohol, (below)	Moisture & impurities per cent by weight (maximum)	Optical rotation at 19.5° to 20.5° on 1 cm thickness (Minimum)	Solubility	entification
12	13	14	15	16
0° C	0.25	+3.5°	Soluble in 2.5 parts of ethyl alcohol (95% V) Miscible with Absolute Ethyl alcohol with chloroform with solvent ether and with glacial acetic acid	Miscible with half its volume of light petroleum (boiling range 40° C to 60° C) and is only partially soluble in two volumes.
0° C	0.25 0.75 1.00		- - -	- - -

N.B. - *Permission for grading medicinal grade castor oil shall be granted to only such packers who own an oil crushing and refining plant for extracting castor oil in cold and refining the same and satisfy the conditions prescribed under the instructions issued from time to time in this behalf.
(The Gazette of India Part II - Section 3 Sub-section (i) No. 19, 1990)

341 New and revised Indian Food Standards

IS 3752: 1988	Alcoholic drinks - Methods of test (first revision). Gr.5
IS 9328: 1989	Confectionery industry - Glossary of terms (first revision). Gr.4
IS 11962: 1987	Method for determination of ash in rennet caseins and caseinates (reference method). Gr.2
IS 12711: 1989	Bakery products - Methods of analysis. Gr.7
IS 12756: 1989	Cheese and cheese products - Determination of total phosphorous content - Molecular absorption spectrometric method. Gr.3
IS 12757: 1989	Cheese and processed cheese products - Determination of citric acid content (reference method). Gr.2
IS 12760: 1989	Dried milk - Determination of sodium and potassium contents- Flame emission spectrometric method. Gr.3

(Standards India, May, July 1990)

342 Pure ghee is anti-cancerous

Research carried out at the National Dairy Development Board (NDDB) by Dr R.P. Aneja and Mr. T.N. Murthy has established that pure ghee contains substantial quantities of anti-carcinogenic (anti-cancer) substances called conjugated linoleic acids (CLA).

A NDDB release said here yesterday that CLAs are produced in the rumen (first stomach) of cows and buffaloes by microbial fermentation. Earlier research had shown that CLAs are produced by fermentation and by heating fats in presence of proteins. CLAs are produced out of the linoleic acid which is an unsaturated fatty acid present in milk fat.

(The Times of India 8 September 1990, 12)

Anti-mutagenic properties of turmeric

Research at the National Institute of Nutrition, Hyderabad, has confirmed the anti-mutagenic effects of turmeric in humans, reporting that it may act as a preventive against several dietary carcinogens.

Similar anti-cancer properties of turmeric were reported earlier in animals.

Studies at NIN showed that turmeric, when incorporated at 0.5 per cent in the diet, had significant anti-mutagenic effects against a single dose of benzopyrene. Further studies conducted this year with lower doses of turmeric and different carcinogens in rats confirmed these results.

The studies also showed that turmeric, was anti-mutagenic against carcinogens like 3-methyl cholanthrene which is known to damage DNA.

Turmeric had considerable toxicity against urinary carcinogens which are excreted by smokers. Experiments with nine normal male volunteers all chronic smokers and between 45 and 60 years of age, showed that when turmeric in doses of 1.5 grams per day were administered in the form of tablets, for 30 days, there was a considerable decrease in the urinary mutagens.

There is also experimental evidence to suggest that turmeric has cholesterolemic and hypoglycaemic effects. Blood samples of smokers who were given turmeric indicated normal levels of glucose, total and high density lipoprotein cholesterol and triglycerides. Turmeric also did not have any toxic or nephrotoxic effects.
(P.T.I. Science Service 9(15), 1990, 3)

Vanaspati units allowed to use mustard oil

Vanaspati industry has been permitted to use expeller mustard oil upto 20 per cent of its raw material requirements.

According to information reaching at Bombay from Delhi, the Union Civil Supplies Ministry will make a formal announcement shortly.

Use of expeller mustard oil by vanaspati units was discontinued sometime in August 1989 and since then the industry has been pleading in vain to allow reuse.

The Government decision is expected to improve marketability of rape/mustard oil prices of which are ruling at less than Rs. 17,000 a tonne.

For the vanaspati industry, which has been forced to cut down its production due to heavy input cost, the Government decision will be a welcome relief. The industry has been meeting its requirement from indigenous oils such as cottonseed and soyabean since early last year when the Government decided to fully discontinue allocation of imported oil at subsidised rates.

Apart from helping vanaspati units, Government intention is obviously to safeguard farmers' interest by stabilising oil and seed prices. Like last two successive seasons, rabi crop this year too is expected to be a bumper 40 lakh tonnes.

The Government has already allowed the National Dairy Development Board (NDDB) to export 25,000 tonnes of mustard oil. Although this is being done to bail out NDDB, which is nursing huge stocks, it has generated a lot of interest in the industry. Private traders in Bombay feel Government should allow them to export rapeseed, to stabilise local prices.

For the past few months, there has been a drop in the vanaspati output with average monthly production declining to 70,000 tonnes against 90,000 tonnes.

(The Oils and Oilseeds Journal 43(1), 1990, 34-35)

345 Pollution control cells in States

All the States except Nagaland and Arunachal Pradesh have taken steps for implementing the environmental laws by setting up State Pollution Control Boards.

Stating this in a written answer in the Lok Sabha on Monday the Environment and Forests Minister Mr. Nilamani Routary, said the Central Pollution Control Board has initiated steps to set up a joint board for both the States under Section 13 of the Water (Prevention and Control of) Pollution Act 1974. The Centre has approached the north eastern council for taking on the functions of the State board for Nagaland.

He said 3160 cases under the Water (Prevention and Control of Pollution) Act, 1974 and 830 cases under the Air (Prevention and Control of Pollution) Act, 1981 have been filed.
(Financial Express 28 August 1990, 4)

346 Cooking up carcinogens - the chemicals generated in our food

Chemical reactions that take place during cooking, baking and preserving generate products that are very important in giving different foods their distinctive aromas and colour. Recently researchers have discovered that many of these products can reduce the food's nutritional value, and some can actually be poisonous.

Franze Ledl of Stuttgart University and Erwin Schleicher of the academic hospital Munich Schwabing in West Germany have studied many of the reactions involved, which are known collectively as the Maillard

lard reaction. They believe that the reaction products could cause some diseases, including certain forms of cancer (Angewandte Chemie, International Edition in English, 1990, vol. 29, p. 565).

Maillard products form when sugar molecules react with amino acids, the constituent units of proteins. The sugar found in the food - for example, fructose and glucose - can exist in a linear form that has a reactive carbonyl group ($C=O$), and amino acids, such as lysine, have at least one reactive amine group (NH_2). Given the right conditions, a carbonyl reacts with an amine group, and the product slowly rearranges to form a so-called "Amadori compound". Once formed in food, Amadori compounds cannot change back and can, in fact, react further to form Maillard products.

Compounds such as furanones, which have a roasted, caramel-like aroma, and the brown pigments found in the crust of a loaf of bread are all formed by the Maillard reaction. The Maillard reaction can even take place in the body, making cross-links between proteins and so damaging the genetic material ('Sweet peril for proteins', New Scientist, 3 March 1988).

Ledl and Schleicher have found Amadori compounds in foods that contain proteins and sugars that have been cooked, stored or even sterilised. Because Amadori compounds are formed from amino acids, this effectively robs the food of some of its nutritional value. This is important for foods, such as powdered milk, that are sterilised for babies. Growing children need a diet rich in amino acids for proper development, so particular care must be taken during manufacturing to prevent damage to essential amino acids.

The amino acid tryptophan, which is found in soya protein, does not form Amadori compounds, but it does form compounds that have been shown to be highly carcinogenic. However, the carcinogens form in significant quantities only when the cooking temperature is more than 130 C. This could explain why the Japanese and Chinese, who use mild cooking techniques, suffer less from certain cancers than those people in the West who boil and roast their food.

There is a positive side to the Maillard reaction. Without it, freshly baked bread would not have its delicious smell. Sunday roasts would look pale and unappetising and fresh ground coffee would be weak and tasteless. Some Maillard products have even been found to prevent cancer.

Ledl and Schleicher believe that suppressing the bad and increasing the beneficial aspects of the Maillard reaction should be the aim of research.

(New Scientist No.1729, August 1990, 32)

Drumstick seeds purify water

The common drumstick *Moringa oleifera*, has been found to have excellent use in water treatment. The water purifying properties of the seeds extracted from the lance-like fruits of moringa is known to the Sudanese for a long time, and scientists at the University of

Leicester in the U.K. have launched an interesting research project to confirm its potentials as a water purifier.

The seeds act as good coagulants, can help in treating drinking water and may come in handy for the rural people who quite often pick up intestinal infections by consuming contaminated water. For water treatment, the white kernel inside the winged seeds should be removed and after crushing it should be mixed with small quantities of pure water by constantly stirring with a spoon for about five minutes. The suspension is to be poured through a strainer on to the stored turbid water and stirred with a wooden stick for 10 minutes. About 30 seeds will be needed for clarifying 40 litres of water.

According to scientists when mixed with river water the pulped seeds give water-soluble proteins that are able to bind finer particles of sediments suspended in the water together forming what is known as floc. Bacteria viruses get enmeshed in the floc and after a period of slow mixing all the colloidal particles settle down at the bottom of the container. The action of the seed pulp is similar to that of the application of aluminium sulphate (alum) commonly used in water treatment, but it is an inexpensive and effective way for the villagers.

(The Hindu 4 August 1990, 4)

348 New fat-free ice cream

Kraft General Foods is testing a fat free ice cream called 'Sealtest Free Non-fat Ice Cream, without the 10% butterfat required under the ice cream standard. The new fat and cholesterol free product with 100 calories a serving, has the taste, texture and appearance of ice-cream. Cellulose gel is the bulking agent in the product. Kraft will have to ask for the amendment of the ice cream standard.

(Chemical Weekly 35(43), 1990, 97)

349 Sani-straw

There are plenty of water purifiers around, but none is as portable as the Accu-Filter - a new water purifying straw from Accuventure, Inc., of Portland, Oregon. The Accu-Filter looks like an oversize (21-centimeter-long) blue straw and works much the same. Before you stick it in a glass of contaminated water and (gulp!) drink. Before the water hits your lips, it goes through a three-stage filtration process that supposedly screens out 98 per cent of 151 harmful chemicals, pollutants and contaminants. The product's inventor, Bruce Spangrud, says drinking out of the straw is much like drinking thick milkshake. He recommends adding chlorine tablets to especially dirty water; the straw will filter out the chlorine. One AccuFilter will filter 30 gallons of water. The straw is sold throughout the world - Cost is \$ 13.

(Newsweek 16 July 1990, 3)

50 Bact-O-kill for safe drinking water

BACT-O-KILL is a new domestic utility device designed and developed by the Indian Toxicology Research Centre (ITRC), Lucknow, to provide safe drinking water to homes.

The electronic device has been developed by a team of ITRC scientists led by Dr. P.K. Ray, to provide clean, disinfected water at a very low cost under the "Water Technology Mission Programme" launched by the Government of India.

The scientists report that experiments conducted after treating the infected tap water in BACT-O-KILL gave "very encouraging" results.

They claim that all the bacteria are killed in 40-45 minutes of treatment. Analysis of the treated water showed that metallic contamination due to the presence of copper, zinc, lead and cadmium was reduced.

The operating cost of the new device is almost negligible, only 10 paise per hour per 10 litres of water. The treated water has prolonged microbicide effect, no health and electric hazards and the device does not require much maintenance.

(P.T.I. Science Service 9(13), 1990, 4)

1 Britain bans 'natural' food supplement after health fears

Hundreds of cases of illness and 22 deaths linked with L-tryptophan, a "natural" food supplement, may have been triggered by a contaminant. Britain's Department of Health has banned the sale of products to which L-tryptophan, an essential amino acid, has been added. The ban follows seven cases of illness in Britain and 1500 cases and 22 deaths in the US.

L-tryptophan is a natural constituent of certain foods such as milk and cheese, where it is harmless. But until the ban, health shops also sold the amino acid in tablet form as a dietary supplement to aid sleep and combat premenstrual tension. It is these products that epidemiologists have linked with symptoms such as severe muscle pain, breathing difficulties caused by fluid accumulating in the lungs, and raised levels of eosinophils, a kind of white blood cell.

Last month scientists met in Los Alamos, New Mexico, to discuss these illnesses, known together as eosinophilia myalgia syndrome (EMS). They produced evidence showing that virtually all cases of EMS in the US could be traced to a few batches of L-tryptophan from a single manufacturer, Showa Denko in Japan.

Chromatographic analysis of these batches showed an impurity, "Peak E", which was not present in other samples of L-tryptophan. Researchers have not yet identified the substance but they strongly suspect that it triggers biological events leading to EMS.

Samuel Page, of the US Food and Drug Administration says the amount of "Peak E" in the samples was very small, making its analysis "difficult and frustrating".

Showa Denko is one of seven manufacturers in Japan that supply the West with L-tryptophan. The company produced the amino acid from anthranilic acid by bacterial fermentation. The period when the "hot lots" were made coincides with a change in the strain of bacteria the company used. Japan's government told Showa Denko to recall all L-tryptophan products in April.

The cause may not be simple. Although some of the scientists at the meeting thought that EMS could be attributed directly to the impurity alone, most agreed that it triggers a complex chain of physiological events including autoimmune responses and changes in the way the body metabolises L-tryptophan itself. A study in the New England Journal of Medicine (vol 322, p. 874) showed that people with active EMS metabolised L-tryptophan differently from healthy controls and people who had recovered from EMS.

The government advised health food shops to stop selling L-tryptophan last November when the US banned sales. The National Association of Health Food Stores supported this voluntary measure. (New Scientist 7 July 1990, 18)

Transfer of Technology & New Industries

352 Sarda Plywood corn syrup project

Sarda Plywood Industries Ltd (SPIL) has signed a memorandum of understanding (MoU) with the Uttar Pradesh State Industrial Development Corporation (UPSIDC) for setting up a Rs.35-crore joint sector unit to make high fructose corn syrup. The project would have imported technology. (Financial Express 22 September 1990, 4)

353 Soft drink plant in Madurai

The first soft drink plant in India with the capacity of filling 550 bottles per minute along with a sophisticated water treatment plant and other facilities, has been set up in Madurai by the Bangalore-based City Drinks, bottlers of Lehar-Pepsi.

Indian Bank Chairman and Managing Director, Mr. M. Gopalakrishnan, launched the production at Rs. 4.5 crore plant here on Saturday.

Speaking on the occasion, Mr. Adaikala Raj, MP and Chairman of the company, said the demand for Pepsi in the four southern States was to the tune of 62,000 to 70,000 bottles per day. City Drinks' Bangalore plant produced 10,000 bottles. The Madurai plant would supplement with another 20,000 and a bigger plant at Madras would be ready within three months.

(Financial Express 30 September 1990, 8)

354 Caffeine Plant set up in Jorhat

A 30-tonne-per-annum caffeine plant, which will use tea wastes as raw material, has been set up in Jorhat in Assam. The plant is based on the technological knowhow and basic design engineering developed by the Regional Research Laboratory, Jorhat. Researchers in Assam have found a new source for commercial production of caffeine in the tea wastes found in the tea gardens of the State.

(Chemical Products Finder 9(2), 1990, 124)

355 Pepsico Unit commissioned

The Rs. 22-crore processing facility, jointly promoted by Pepsico, Punjab Agro Industries Corporation and Voltas, has launched the operation with the processing of tomatoes into tomato paste. Its fruit and vegetable processing complex, which is Asia's largest one with a capacity to produce 600 tonne per day was commissioned at Zahura in Hoshiarpur. The plant has already received an order to export 4,000 tonne of tomato paste to the US. This is the second plant commissioned by Pepsi Foods this year. The plant has been commissioned seven months behind schedule.

(Chemical Products Finder 9(2), 1990, 134)

- Agriculture, biotechnology for 267
 Alcohol, industrial, CCS with-
 drawal 316
 Alcohol sterilization in food
 packaging 270
 Aspartame by Searle India 328

 Bact-O-Kill
 electric device,
 drinking water 350
 Banana production 302
 BARC food irradiation
 studies 272
 Basmati rice export 313
 Biodegradable plastic 299
 Biotechnology in Agriculture 267
 Biscuit wrapping machine 292
 Black pepper production 301
 Bread without wheat 281

 Caffeine plant, Jorhat 354
 Cardamom
 cryogenic grinding 280
 export, freight subsidy 311
 production 301
 Castorseed production 300
 Central Excise
 exemption, amendment order
 334, 335, 338
 ice-cream 333
 pickles 332
 Chemical reactions during
 cooking 346
 Chillies production 301
 Chymosin, approved by FDA 275
 Cocoa bean export 315
 Coconut production 302
 Coconut water, bottled
 soft drink 283
 Coffee
 quota reintroduction plea 338
 Cooker, rice, electric 297
 Cooking, chemical reactions 346
 Copra, minimum support price 325
 Coriander production 301
 Corn syrup project
 Sarda Plywood 352
 Cryogenic grinding, cardamom 280
 Culinary herbs survey 266
 Drier,
 grapes dehydration 296
 vacuum, double cone 295

 Drumstick seeds for
 water purification 347
 Duty relief sought, food
 industry 323

 Edible oil
 import 322
 unit set up, Tamil Nadu 327
 Energy (from) sugarcane
 waste 287
 Export
 basmati rice 313
 cardamom, freight
 subsidy 311
 cocoa bean 315
 marine products 312
 milk powder under OGL 309
 milk powder, Australia 310
 tea 314
 wheat products, ceiling 317
 Export Inspection Council
 reconstitution 319
 Export promotional
 offices closure 320
 Exporters
 registration amendment 318

 Fat free ice-cream, new 348
 Fat substitute,
 synthetic 285
 Filling machine, powder,
 rotary 291
 Flour, edible quality,
 from soyabean 284
 Food, alcohol sterilization
 270
 Food and beverage products
 by Lipton 329
 Food industry,
 cleaning pump 294
 duty relief 323
 Food irradiation
 studies at BARC 272
 unit in India 271
 Food processing industry
 promotional scheme 326
 Fruit and vegetable
 production, hike 304
 Fruits, dry, import 321

Garlic production 301
 Ghee, pure, anti-cancerous 342
 Ginger production 301
 Grapes dehydration, drier 296
 Groundnut production 300
 Gur, ST withdrawal, Maharashtra 324

 Herbs for culinary purpose 266
 Hydrothermal treatment for soyabean oil 279

 Ice-cream
 central excise 333
 fat free 348
 Ice cream maker, electric 298
 Import
 dry fruits 321
 edible oil 322
 Indian Food Standards, new 341
 Industry, food, duty relief 323
 Industry, food processing, promotional scheme 326
 Insects control, non-insecticidal method 273
 Iodising salt, new process 282
 Irradiation, food, unit in India 271

 Jute sticks, sugar production 286

 Khandsari production and sales rules 339

 L-tryptophan, banned 351
 Linseed production 300
 Lipton, food and beverage products 329

 Mango peeler-slicer 293
 Marine products export 312
 Milk powder
 export, Australia 310
 export, under OGL 309
 Mixer, portable 288
 Monosodium glutamate replacement 276

Mustard oil use in vanaspati units 344

 Nigerseed production 300

 Oil
 edible, import 322
 soybean, hydrothermal process for extraction 279
 sunflower, new variety 276
 Oils, vegetable, grading and marketing rules 340
 Oilseeds production 300, 308
 Onion production 303

 Packaged food, alcoholic sterilization 270
 Pepsico unit, Hoshiarpur establishment 355
 Pickles, Central Excise 332
 Plastic, biodegradable 299
 Pollution Control Cells in States 345
 Pork storage 269
 Potato production 303
 Pouch sealing machine 289
 Prevention of Food Adulteration Rules (amendment) 336-7
 Production
 banana 302
 black pepper 301
 cardamom 301
 castorseed 300
 chillies 301
 coconut 302
 coriander 301
 fruit/vegetable 304
 garlic 301
 ginger 301
 groundnut 300
 linseed 300
 nigerseed 300
 oilseeds 300, 308
 onion 303
 potato 303
 rapeseed/mustard 300
 rice bran oil 306-7
 safflower 300
 sesamum 300
 soybean 300
 spices 301
 sugar 305
 sunflower 300
 sweet potato 303
 tuber crops 303
 turmeric 301

Rapeseed/mustard
production 300
Rice, Basmati, export 313
Ricebran oil
production 306-7
refinement process 278
Rice cooker, electric 297

Safflower production 300
Salt iodising 282
Sani-straw 349
Sarda Plywood, corn syrup
project 352
Seafood storage 268
Searle India, aspartame
production 328
Sesamum production 300
Soft drink plant,
Madurai 353
Soyabean
processing to edible
flour 284
production 300
Soyabean oil
hydrothermal treatment
for oil yields 279
Spices production 301
Sterilization of food in
packaging by alcohol 270
Storage
pork 269
seafood 268
Sugar
production 305
production, jute sticks 286
Sugarcane waste as
source of energy 287

Sunflower
oil, new variety 277
production 300
Supercritical fluid
extraction, vanilla 274
Sweet potato production 303

Tea Board offices closure 331
Tea export 314
Tube filling, sealing/closing
machine 290
Tuber crops production 303
Turmeric
anti-mutagenic property 343
production 301

Vanaspati units, mustard
oil use 344
Vanilla, supercritical
fluid extraction 274
Vegetable and fruit
production hike 304
Vegetable oils grading
and marking (amendment)
rules 340

Water, drinking, Bact-O-Kill
for 350
Water purification, drumstick
seeds 347
Water purifying straw 349
Wheat products export
ceiling 317
Wheatless bread 281
Wrapping machine, biscuit
292

Errata

Item 40 on page 23 of Jan-Mar 1990 issue of Food Digest -

Please read -

Area in ha (thou) as Area (hectares);

Production in (thou) tonnes as Production in tonnes.

All-India total production as 4,49,57,442.7 tonnes.

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